A CRITICAL EVALUATION OF

PRODUCT INNOVATION MANAGEMENT

IN A SMALL TO MEDIUM SIZED ENTERPRISE
A Critical Evaluation of Product Innovation Management in a Small to Medium Sized Enterprise

DECLARATIONS AND STATEMENTS

Declaration

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed............................................(candidate)

Date...........................27/5/08..............

Statement 1

This thesis is the result of my own investigation, except where otherwise stated. Other sources are acknowledged by footnotes giving explicit references. All other sources have been fully acknowledged and referenced is appended.

Signed............................................(candidate)

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Statement 2

I hereby give consent for my thesis, if accepted, to be available for photocopying and for inter-library loan, and for the title and summary to be made available to outside organisations.

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Date...........................27/5/08..............
This research was undertaken in order to critically evaluate the Quest product innovation process and to determine if it promotes successful New Product Development (NPD) in a Small to Medium-sized Enterprise (SME). The Quest process was evaluated by comparing it to best practice reports in literature, and then by using it to develop several products in an SME environment via an action research methodology.

Data was collected in the form of meeting minutes, observations of the team members, and the analysis of project documents such as financial analysis, the project time line, and stage gate reviews.

The analysis of these results suggests that the Quest process contains many of the best practice NPD principles. However, this research also demonstrated that using an NPD process correctly is only one of the factors that contribute to successful NPD.

This research demonstrated that there were several other factors that contributed to successful NPD that must be controlled by the project team. These were the evaluation of the products at the phase gates, the use of the NPD process intuitively to fit the needs of the project, and the understanding and inclusion of all the business disciplines, especially marketing principles.

During the project a factor outside the control of the project team had a major influence on the outcome of the research. That was the change in the businesses marketing strategy from high to low risk. This move resulted in the
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project being stopped in favour of a production focused business improvement plan to reduce waste and increase productivity.

This research demonstrates that there are many factors that must be managed correctly in order to achieve successful NPD.

ACKNOWLEDGEMENTS

I would like to acknowledge my supervisor Dr Louise Fielding who guided me through this study and the management team of Golden Vale Dairies who provided the context for this study.
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CRITICAL LITERATURE REVIEW

1 INTRODUCTION

This review concentrates on defining the contemporary best-practice principles that relate to the product development process in SMEs in the UK food industry. By focusing on this area of research, this review will highlight the factors that need to be taken into account when evaluating the product innovation process at the company.

1.1 DEFINITION OF INNOVATION AND NPD

The theory of innovation applies to all aspects of improvement that occur within a business, be it management systems, equipment, people, processes, or products.

The ability of a company to 'innovate' is often identified as a source of a company's long-term competitive advantage. However, the focus of innovation differs from company to company, as do the methods, tools and processes used in the innovation process. Assuming the tools, process and resources are in place, the key ingredients to successful innovation have been defined by Ryan (2004) as individuals, working together in teams, in line with the strategic direction of the organisation.

Product innovation (i.e. NPD) is a subset of the innovation discipline, and as such the principles that govern best practice innovation also govern successful NPD. The terms 'New Product Development' (NPD) and 'Product Innovation' are used interchangeably throughout the literature. Best practice innovation
strategies contain NPD as an essential component. Cooper (1993) stated that routinely launching new products was a route to survival and growth for large and small firms alike.

The ‘New Product Development’ process stretches from idea generation to the launch of a product into the market place. The principles of best practice NPD can be applied to the whole spectrum of product improvements, from incremental changes that provide cost reductions or improved features, to line extensions, and radical new products never seen in the world.

The factors that result in successful NPD is not clearly defined or agreed in the literature. However researchers agree in general that successful NPD is the result of a process that finds a market gap, and fills it with a new product to meet the customers’ needs and provides revenue for the company (Price, 2003).

NPD is a truly cross-functional discipline as it is linked with the wider managerial issues of strategy, structure, and human resource management. NPD requires marketing, technical, engineering and logistical skills to create or change a product to satisfy the customers need (Jones, 1998).

The elements that constrain or enable successful NPD within an organisation are the same elements that constrain or enable the development of the company as a whole. These factors are capital investment, physical resources, systematic control of the process, and the management of human resource.

**1.2 Factors that Influence the Success of the NPD Process**

This review intends to analyse research that focuses on best practice principles of the NPD process, and the factors that influence the success of the process.
Success in NPD is generally defined as delivering a new product to the market that meets the consumers’ needs, and company’s sales and strategic objectives. There are many factors in the NPD process that have been researched. This analysis has focused on the factors that are regarded as major influences. Major factors have become apparent when a factor is being referenced by more than one study, or by large studies with a convincing level of analysis. These factors were found to be:

External Factors

- Economic environment
- Political factors
- Market conditions and the activity of competitors in the marketplace
- Customer requirements

Internal Factors

- The NPD model used
- Management of the NPD process
- Ability to create a company culture that encourages innovation
- Business strategy and product innovation strategy

1.3 The History of New Product Development

Modern product development theory is evolving in response to the ever changing business environment. Since the industrial age, there has been an ever increasing pressure on businesses to achieve great profits through the introduction of new products. Before the 1970s, product life cycles were very long; this meant that the product development process also had a very long
time scale. Rudolph (1995) reported that a group of consumer products in the 1920s took 28 years on average to reach full production from their initial introduction to the marketplace. Rudolph (1995) also reported that up until the 1970s NPD activities were undertaken in research centres remote from the main activities of the company. The mission of such development centres was to invent interesting phenomena. Research centres were self-directed and not linked to a company business strategy. Since the 1970s the product development time scale has reduced. Barclay et al. (2000a) reported that similar group of products to those studied by Rudolph (1995) in the 1920s showed a reduction in the time taken to develop from 28 years to 10 years.

Since the 1970s, many industries have experienced increases in product introductions, decreases in product lifecycles, and a quickening in the rate of change of customer needs. These trends along with increasing competition from local and international rivals are forcing manufacturers to improve their performance. As a result, companies are paying closer attention to the success of product development to provide new streams of revenue (Price, 2003).

Some authors have attributed the failure of high profile organisations to the failure of new products to return a profit on capital invested. Cooper (1988) reported the following statistics that highlight the high risk associated with product development:

- One product concept in seven becomes a commercial success.
- Roughly half the resources that the United States industries devote to product innovation are spent on failures and killed projects.
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- 63% of executives are 'somewhat disappointed' or 'very disappointed' in the results of their firms' NPD efforts.

- New products face a 35% failure rate.

Other authors have also report similar statistics:

- Saban et al. (2000) reported that a study carried by Royal Dutch / Shell found that one third of Fortune 500 firms listed in 1970 had vanished by 1983 largely due to failure in new product development.

Regardless of the risk involved in NPD some companies do succeed in this field. Deschamp and Nayak, (1995) reports that market leading companies gain nearly 49% of the revenues from products less than 5 years old. This statistic suggests that market leaders have achieved their success through successful product development.
2 THE NPD PROCESS – BEST PRACTICE PRINCIPLES

Investing in new product development as part of the business strategy has a well-known reputation for carrying a high risk of failure and demanding significant resources. Given these characteristics, it is not surprising that a significant amount of research has been undertaken to find ways to reduce the risk of product failure and the associated cost of this process.

One method of reducing the risk of product failure has been to manage the development through a formalised NPD process. Such a framework promotes the systematic investigation of the new product proposition, and progressively evaluates the likelihood of the product’s success. As a result, there are opportunities for corrective action to be taken to adjust the product proposition before the product is launched and, therefore, increase the likelihood of its success.

2.1 INTRODUCTION TO THE NPD MODELS

There have been many variations of the product development model published by researchers. Several of these models have been adopted by industry sectors. Jones and Stevens (1999) state that the most widely accepted stages in the product development model are exploration, screening, business analysis, development, testing and commercialisation.


Rudder’s analysis shows that these models have a great deal in common.
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Each model is made up of sequential stages (generally 5-8 stages) beginning with idea generation and followed by technical, market, and business analysis then product development, consumer trials, and finally commercialisation.

There are critical decision points throughout the process to halt projects if they are unlikely to be commercially successful. Other common features are:

- NPD protocols that promote the use of cross functional teams.
- Evaluating the success of projects through performance metrics.
- Directing the use of NPD resources towards the overall company development strategy.

However Rudder et al. (2001) conclude that there is no consensus in the literature as to the right or wrong way to manage the process of new product development. They conclude that an organisation should not be tied to one model but should use the basic fundamentals of a food based NPD model and adapt it to their particular situation (Rudder et al. 2001).

The product development process has been found to be an important factor in determining the success of new products. Cooper (1994) studied the NPD practices of 306 companies and measured the success of the NPD process in terms of the success rate and the speed to market. The following factors were found to determine the success of the NPD process: a multi-stage NPD process, multi-disciplinary team, and the inclusion of marketing activities and a pre-development assessment. Companies which were strong in these practices had a higher rate of success in NPD projects and their products reaching the market at a faster pace than companies that did not perform well in these areas.
2.2 Principles of the Stage Gate Model

The 5 stage product development stage-gate model outlined by Cooper (1993) has been referenced by many researchers hence it can be considered a NPD process benchmark. Coopers model consists of the following stages:

<table>
<thead>
<tr>
<th>Gates – Go / Kill decisions</th>
<th>Stage After the Gate</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Idea Generation -</td>
<td></td>
</tr>
<tr>
<td>1 Initial Screen – Remove ideas that obviously won’t work.</td>
<td>Preliminary Investigation – Quick desk research into the market, technical and operational fit to the business.</td>
</tr>
<tr>
<td>2 Second Screen – Rigorous screen against ‘must-meet’ and ‘should meet’ criteria.</td>
<td>Detailed Investigation – the building of a business case. This includes a competitive analysis, concept testing, investigation into the technical and manufacturing requirements, financial and market analysis.</td>
</tr>
<tr>
<td>3 Decision on Business Case - Product definition, financial analysis and development plan including a commitment to allocating resources and preliminary marketing and production plans.</td>
<td>Development Plan – Planned activities with timelines, and resources. Product prototypes, testing and marketing plans and manufacturing requirements are defined.</td>
</tr>
</tbody>
</table>

*Figure 1 - Typical stage gate process tasks Cooper (1994)*
<table>
<thead>
<tr>
<th>4</th>
<th>Post Development Review - Review of the Development stage to ensure that the product is consistent with the original proposition. Review of the financial analysis and approval of the validation plans.</th>
<th>Testing and Validation - Testing of the commercial viability of the project and product, testing of customer acceptance, and the impact of external economic factors.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Pre-commercialisation Business Analysis (Final gate before commercialisation). Acceptance of the analysis results in the funding and support by the leadership team of the commercial product and marketing launch plan.</td>
<td>Full Production and Market Launch Implementation of the marketing and operational product launch plans followed by the implementation of the post launch monitoring plan.</td>
</tr>
</tbody>
</table>

The best practice principles that Cooper (1994) endorses have been summarised by Price (2003):

Reduction in the time spent on poor quality projects: Stages 1 and 2 halt projects that are not going to succeed before resources are spent on them.

Cross functional teams improve the quality of work and decisions made: This principle replaces the traditional functional team approach.

Reduced time taken for new products to reach the market: Tasks within a stage can be carried out in parallel (assuming adequate resources) hence reducing the time taken to complete the stage.

Customer focus: A strong market orientation is built into the whole process, increasing the possibility that the product will meet the customers' requirements.
Clarity of tasks: Detailed product definitions are developed early in the process to provide clarity to the outcomes required by the completion of tasks.

Flexible process to allow fast tracking of low risk projects: The process can be streamlined for low risk projects. Gates can be combined and stages collapsed, if agreed to by the gatekeepers.

An audit and review of the project needs to be carried out between 6 – 18 months after a product launch. In this way, the lessons learnt from NPD projects can be maximised and improvements made to the process in subsequent projects.

2.3 GATES – PURPOSE AND PROCESS

The gates between each stage are designed to evaluate the work carried out in the previous stage against the original objectives of a successful product launch and delivery of an adequate return on the investment made. Cooper (1993) recommends that the gates take a common format and consist of three main components:

**Deliverables:** a review of the information required for the Go / Kill decision is provided from the previous stage.

**Criteria:** the decision criteria for both financial and qualitative results are required, including ‘must meet’ and ‘should meet’ objectives.

**Outputs of the gate:**

- Go (to the next stage)
- Kill (terminate the project)
• Hold (the product passes the gates ‘must – meet’ criteria, however priorities dictate that this project is not to be pursued at the current time)

• Recycle (repeat the stage if the project team has not delivered what is required to make the decision)

Must meet criteria = pass / fail decision based solely on the project in hand.

Should meet criteria = an assessment of the compatibility of the project to the company's present situation and strategy. This can result in projects being placed on hold as there are more urgent projects that require resources.

2.3.1 Roles and Responsibilities of Gate Keepers

Cooper (1993) proposed that gate keepers are responsible for the rapid commercialisation of the best projects and preventing resources being wasted on projects that are not commercially viable. Effective gatekeepers groups are:

• Cross functional

• Make timely decisions to ‘Go’ or ‘Kill’

• Prioritise projects effectively

• Establish deliverables for successive gate meetings

• Have the authority to ensure resources are available for the subsequent stage

• Are able to mentor project teams to achieve the desired result

• Set high standards for the quality of the execution of project tasks

It is worth noting that none of the models mentioned above take into account the strengths and weaknesses of a company, company structure or resources
available to carry out the project tasks. Nor do they take account of the need to manage the people taking part in the process. Instead, researchers who publish articles on the principles best practice NPD process assumed that NPD happens within an unbiased and fully resourced environment.

2.3.2 Idea Generation and Evaluation

Idea generation is the first stage in the NPD process and involves the collection of ideas from multiple sources followed by the initial screening. This stage of the NPD process is inherently different to the subsequent stages.

Ideas can be sourced internally, for example from sales representatives or consumer responses, or externally from sources such as conferences, trade shows, market analysis, Fuller (1994).

Ideas must be evaluated objectively to assess their viability and suitability to the company's marketing strategy and capabilities. There are three critical areas that must be considered when evaluating ideas. Firstly, the potential return on investment must be suitable whether the product is being made through existing equipment or through new facilities. Secondly the product must fit the strategic plan, whether it is to remain within the existing customer base or aimed at securing new customers. Thirdly, the product idea must fulfil an unmet customer need. Understanding the customers' needs is essential to designing a product that will be successful in the marketplace. (Price, 2004)

2.4 The Quest NPD Process

The process used at the company used in this research (the Company) is called Quest and is very similar to the process outlined by Cooper (1994). The NPD
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process follows the same number of steps and also provides a framework to investigate the products potential success through pass/fail criteria. The Quest process has been adopted from the company’s previous head office. Since adopting the process the company has become independently owned and the corporate body has been sold to another company. Hence the link to the original source of this document has been lost. A summary of the Quest process is given in figure 2 below.

<table>
<thead>
<tr>
<th>Figure 2 - A summary of the Quest NPD process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Idea Generation and Screening:</strong> An initial assessment of ideas to check that they fit with the company’s product and marketing strategy.</td>
</tr>
<tr>
<td><strong>Stage 1 - Concept Phase:</strong> A fast check of the market, existing capabilities and financial viability, and the tightening of the consumer/product proposition.</td>
</tr>
<tr>
<td><strong>Gate 1 - Concept Screen:</strong> A review of the project against specific criteria for strategic fit, market attractiveness, competitive position, potential revenue and technical factors.</td>
</tr>
<tr>
<td><strong>Stage 2 - Feasibility Phase:</strong> An extensive stage that requires market research, competitive analysis, financial justification, as well as technical and manufacturing assessment.</td>
</tr>
<tr>
<td><strong>Gate 2 – Decision on Business Case:</strong> This requires the management team to ‘sign off’ on the project and commit resources so that the development can be undertaken.</td>
</tr>
<tr>
<td><strong>Stage 3 - Development Phase:</strong> An extensive stage where most of the technical and marketing development takes place. This will include: branding, packaging design, pilot product runs, marketing plan and extensive market research.</td>
</tr>
</tbody>
</table>
Gate 3 – Investment Decision Screen: the major commercial decision gate with commitment needed to proceed with investment and marketing plans.

Stage 4 - Testing and Validation: An extensive stage in preparation for market launch. This includes the procurement and commissioning of the production facility, recruitment, training, advertising and promotion planning and test marketing.

Gate 4 - Pre-launch review: Final review before the product is launched.

Stage 5 - Full Production and Market Launch: Full implementation of plans for production, distribution, marketing, sales and human resources. Monitoring systems for tracking actual performance need to be in place to record the events as they happen.

Post Launch Team Review: A full review of the project from idea to launch by the project team.

The whole of the Quest document can be found in Appendix 1.

2.4.1 Critique of the Quest Process

The Quest process is suited to the corporate environment where there are specialist staff that have the knowledge, time and discipline to follow these procedures. It assumes that the participants of the process have a good knowledge of the marketing, financial and operational disciplines required to make informed stage gate decisions. It also assumes that it is possible to form cross functional teams to undertake the projects.

In the corporate environment it is reasonable to expect these pre-requisites. However in the SME environment, these assumptions are not all valid. The
resources available to SMEs are much less than that of their corporate competitors. Hence, this process needs to be trialled in the SME if it is to provide a successful process guideline for NPD in the Company.

2.5 MANAGEMENT OF THE NPD MODEL

The management of NPD projects through a formalised process has been studied by many researchers. There is a lack of agreement between researchers as to the specific factors that influence the success of the NPD process. This could be due to case studies containing a small number of companies resulting in the conclusions not being directly transferable to the wider business context. Hence, the list of factors below has been compiled from studies carried out by well respected researchers in the area of NPD process management who have completed studies that involved substantial number of companies.

2.5.1 Factors that Influence Success

A formal process

Griffin (1997) investigated NPD practices in the United States. The results showed that the best performing companies (22% of the sample group) had a formal process that began with a clear strategy, had been using formal procedures for longer period of time and had more steps in the NPD process than the rest of the companies in the study. Griffin (1997) also reported that better performing US firms rejected functional, sequential processes in favour for of a multi-functional stage gate approach.

Effective completion of initial stages of the NPD process
Cooper (1994) found that the effective completion of the first few stages of the NPD process were pivotal to the success of new products. This conclusion was drawn after reviewing the success of new products launched by 306 manufacturing firms in Canada.

Cooper (1994) also attributed the effective completion of these stages to the reduction in the time taken to complete the product development cycle. The reason for this was thought to be the increased clarity given to early decisions such as early and specific product definition led to a measurable success in the study carried out by Cooper (1994).

**Careful evaluation at the stage gates**

The managerial focus on careful evaluation at the decision points was also found to be an important factor in the study by Cooper (1994). From this analysis of 302 firms that undertook product launches, Cooper concluded that the decision 'gates' can be the weakest parts in the entire process, yet ironically these steps are designed to have a strong bearing on the projects outcome.

Cooper (1994) also found that the quality of the execution of the initial market tasks was extremely important i.e. the market testing / trial sell and pre-launch business analysis. Consequently, it was concluded that these tasks were omitted in companies that failed at product development process and were executed well in companies that succeeded at NPD.

**Pre-launch Business Analysis**

It was found in two separate studies that the pre-launch business analysis decision point was frequently omitted (47% in 203 firms in the manufacturing industry and 65% in the chemical industry) however it was also noted that these
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steps were carried out more frequency in companies that succeeded in product development (Cooper, 1994).

**2.5.2 NPD Management Tools - Performance Metrics**

Companies that invest in product development can measure the performance of the process in order to improve it. The performance of a project can be measured during the process or after the product has been launched. Price (2003) has summarised the work of Cooper (1994) and reports that the type of measurements that show the effectiveness of the NPD process can be divided into in-process and long term measurement. Long term measurements are used to determining the health of the NPD process, however it takes a great deal of time to gather this information; hence short term measurements are also used to give early warning signs of the process's ability to deliver the objectives (Price, 2003).

**Short Term Measurements**

- Post-process metrics: timeliness of a project to meet all the stated objectives, and the variance from the original budget.

- In-process metrics: Quality of gate meetings and deliverables.

- Degree of deviation from the New Product Process Rules e.g. change of the product specification after Gate 3, number of cancelled or postponed gate meetings, product development projects taking place outside the process.

- Timeliness of the projects reaching the gates.

- Budget performance - percentage of projects to achieve the budget at each stage.
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Long Term Measurements

- Financial: actual profitability vs. predicted or actual manufacturing costs vs. predicted etc.

- Success Rate: percentage of products launched that have become a commercial success.

- Percentage of sales and/or growth coming from NPD vs. growth targets.

Price (2003) observes that these metrics are financially focused and are common in articles published between 1980 and 1990. Since this time, a more balanced approach has been advocated with the inclusion of non-financial measures such as customer satisfaction and organisational learning.

2.5.3 Portfolio Management of NPD

It is inevitable that within a company there are more projects vying for resources than there are resources available. Hence methods have been devised that guide managers to allocate resources.

Benefit Measurement Technique: This is a measure of the suitability of the project against strategic variables such as the projects fit with corporate objectives, competitive advantage etc. This assessment is most useful at the early stages where there is little solid financial data available (Price, 2000).

Financial Models:

A) Traditional Payback, ROI, NPV and IRR widely used:

- Payback = time taken to recover the money spent
- ROI = return on investment – this is a measure of profit that will be made from the product over a set period of time.
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- NPV = Net Present Value
- IRR = Internal Rate of Return

B) A contemporary financial model proposed by Cooper (1998) is shown in figure 3 and attempts to include the risk and uncertainty of a NPD project:

\[
\text{£ECV} = \{ (\text{PVI} \times \text{Pcs} - C) \times \text{Pts} - D \}
\]

£ECV = Expected Commercial Value of the Project

Pts = Probability of Technical Success

Pcs = Probability of Commercial Success

£D = Development Costs Remaining in the Project

£C = Commercialisation (Launch) Costs

£ PVI = Present Value of Projects Future Earnings.

**Figure 3 - Determining a project's expected Commercial Value (Cooper, 1998)**

Cooper et al. (1997, 1998) has identified 3 potential strategic goals to be considered in magnitude of the benefit a new product may have on the existing product portfolio and the impact it has on reaching the company's strategy. These are:
A) Maximise the values of the portfolio. This can be achieved by dividing the Expected Commercial Value of each project by the quantity of the constrained resource required to complete the project. This indicates which projects will deliver the highest commercial value per constrained resource.

B) Balance the Portfolio: This can be achieved by evaluating the risk and reward elements of each project. This is best explained by figure 4 below:

The visual reference is a guide to ensure that there is a balance between the projects.
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Pearls: Projects that have a high probability of technical success, and are likely to provide a high NPV

Oysters: Projects with high potential rewards but a low probability of technical success i.e. an oyster may turn into a pearl however there is a low probability of this happening.

White Elephants: projects that have a low probability of success and a low level of reward.

Bread and Butter: These are projects that have a high probability of success and a low return such as line extensions.

In summary, Coper (1998) advocates that a successful NPD strategy should:

- Covert the Pearls – these are the ‘cash cows’ of the future.
- Cull the Elephants (i.e. the products that have little customer appeal and are not selling well)
- Do not generate too many bread and butter projects (i.e. incremental development such as line extensions)

C) Match the portfolio of products with the company’s strategy. This will ensure that resources are spent in appropriate areas. This can be managed through the decision process at each gate by the cross functional team (known as bottom up control) or through directing the spending on certain types of projects by senior managers (known as to down control).

Performance measures and portfolio management techniques have been recommended by researchers in the context of the corporate environment. This environment is one of multiple projects being undertaken in parallel via multiple
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project teams and competing development priorities. The corporate environment is different to that of the SME as there are less specialist resources to carry out such projects. Hence these metrics may not be appropriate in the development process of an SME. This will be discussed further in section 4.7 of this chapter.

Researchers who have recommended NPD management tools have assumed that decisions are made on a completely logical basis. However this can be far from reality as internal political pressure can significantly influence the decisions made (see section 4.6 of this chapter.)

2.6 OPINIONS ON THE APPROPRIATE USE OF THE NPD MODEL

Should the NPD model be followed explicitly or should it be used as a guide?

Cooper (1994) advocates that the NPD stages can be streamlined to fast track low risk projects or extended for high risk projects where more time and attention is needed to reduce the risk of failure. This advice from Cooper (1994) implies an intuitive approach to the NPD model, where the use of the model is specific to the nature of individual NPD projects.

Johnson and Scholes (1993) suggest that the use of models should be limited to well structured problems, as there is a danger that an NPD model can cause the over-simplification of a process that is very complex.

A quote from Jones and Stevens (p174, 1999) brings a different perspective of NPD models:

‘The primary reason why NPD models are ineffective is that those studying innovation oversimplify the complexity of organisation behaviours. While
managers know from experience that internal politics are important in shaping decision making academics writing about NPD persist in ignoring such issues.'

A final variable to consider is the availability of time and resources to carry out the NPD process due to time pressures caused by competition in the marketplace or internal resource shortages. These time and resource constraints increase the risk of NPD failure and must be considered when structuring NPD projects. In some situations, the goal of getting the product into the marketplace ahead of a competitor may be the highest priority; hence all other time and resource related scheduling of the product development project would be sequenced accordingly.

In summary, comprehensive advice is available relating to NPD models; the factors that lead to successfully launched products and how to use NPD management tools. However, the concepts outlined by Cooper (1994) and the other authors reviewed in this chapter, apply to the corporate environment. They are also concepts that have been recommended from an academic point of view which is generally not privy to the internal politics that inherently influence decision making. Hence, the relevance of these concepts to the SME environment will be examined further during this study.

3 EXTERNAL FORCES THAT INFLUENCE THE NPD PROCESS

There are many external factors that can determine the success of a new product that are outside the control of the company. Examples include changes in the economic environment, market conditions and changes in customer needs.
3.1 POLITICAL AND ECONOMIC ENVIRONMENT

The political and economic environment can influence the success of new and existing products. Changes in the external environment are often outside the control of manufacturers, however close attention must be paid to these factors as they can significantly affect the sales of new and existing products.

An example of a change in the political environment that has had a direct effect on the food manufacturing industry; was the recent change in food labelling legislation. There has been a significant tightening of the regulations that govern the health claims on food packaging, (Food Standards Agency 2006). This has weakened the unique selling points of new products in the functional food sector as the products are now unable to claim that they are beneficial to consumers’ health.

An example of the change in the economic environment and the impact that it has had on the food manufacturing industry is the recent increase in the size of the European Union (EU). This has allowed new EU member countries to sell their products within the EU with the competitive advantage of lower manufacturing expenses. It has also allowed large numbers of migrant workers to be used by UK manufacturers to lower production costs.

3.2 MARKET CONDITIONS

Product markets are dynamic, as consumer trends and competitor tactics constantly change. In the consumer food sector the current dominant trends are convenience, luxury and health (Leatherhead Food International 2006).

These trends are being driven by the changes in the lifestyle of the population and the changes in technology which have made consumers lives busier.
Manufacturers must be aware of the market trends and actively position their new products to fulfil changing customer needs.

The timing of a product launch can be reliant on activities happening within the marketplace. For example, a launch date may be planned to combat competitor's activities. This commercial reality of the market adds pressure critical decisions at the 'stage gates' of the NPD process. This can result in decisions being rushed and increasing the risk of failure (Cooper, 1994).

3.3 CUSTOMER REQUIREMENTS

External customer requirements must be met if a new product is going to succeed. Customers' needs are not easy to define, nor are they constant due to the ever changing business environment. Hence, it is crucial that NPD is carried out with this in mind.

Not all customers appreciate the benefit that new products can bring. Saban et al. (2000) recognises that different types of customers give different types of feedback. Some customers are not innovative hence their suggestions for how best to meet their needs would lead to only small changes in the product. Conversely, innovative customers are more likely to identify radically new products that would fill a market need. Saban et al. (2000) recommends, therefore, that companies should work with lead customers who are pro-active and aware of changing market needs.

4 INTERNAL FORCES THAT INFLUENCE THE NPD PROCESS

Many researchers have attempted to identify the internal factors that lead to successful product innovation. In particular, the link between successful NPD
and factors such as the company's resources, skill base, culture, strategic choices and the risk profile of senior management have been investigated.

Research papers present differing arguments as to the factors that should be emphasised and controls or systems that must be in place to achieve an innovative solution. Despite the apparent differences, research in this field points to the same conclusion: the factors that constrain or enhance product innovation are the same factors that constrain or enhance the success of the business in general.

4.1 STRATEGIC ORIENTATIONS AND ORGANISATIONAL CULTURES THAT PROMOTE PRODUCT INNOVATION

Culture has been defined by an influential theorist as a pattern of basic assumptions by a given group that it uses while learning to cope with external adaptation and internal integration. These patterns have worked well enough to be considered valid hence they are taught to new members as the correct way to perceive, think, feel in relation to those problems. Schein (1985).

Schein (1985) stated that the culture and strategic direction of an organisation are linked. The strategic orientation set by top management can determine the decision making process, resource allocation, and attention given to the business functions. The strategic direction, therefore, ultimately influences the culture of the organisation.

There are two widely researched strategic orientations that have been identified as drivers of product innovation. These are market orientation (also known as market-pull) and the technology-push orientation. These concepts have been
based largely on research carried out in large companies (Salavou and Lioukas, 2003).

Salavou and Lioukas (2003) proposed that in addition to the strategic orientations of market pull and technology push a third alternative exists that is better suited to the SME, this is the entrepreneurial-push orientation. This view was formed as a result of research into the link between Greek food companies’ strategic orientation and their ability to create radical product innovation.

4.1.1 Market-Pull Orientation

The prevailing view amongst academics and the commercial sector is that marketing orientated firms are the most innovative as they respond quickly to changes in customer needs and will, therefore, provide new products to fulfil their un-met needs (Salavou and Lioukas, 2003).

A ‘market pull’ strategic orientation was also found to be a major factor in the success of new products by Cooper (1994). For example a company that tries to fulfil unmet customer needs by creating a new product is defined as having a ‘market pull’ orientation. This was discovered when undertaking research into the success of new products launched by 306 manufacturing firms in Canada. This research concluded that market orientated firms spent more time and resources on the initial phases of the product development process such as idea generation, design of the product, and the application of new technology. Successful projects had 2.2 times more money spent on market orientated activities than projects that failed. These activities included seeking customer input, market studies, and customer tests. The same study also found that successful companies spent more time and resources on customer orientated
activities such as the market research, market assessment, customer tests, trial sells and product launch.

4.1.2 Technology-Push Orientation

Innovation can be achieved by a technology push orientation. This is when firms focus on implementing new technology to find new solutions to customers’ needs or create new customer needs and push these into the market place (Salavou and Lioukas, 2003). For example the filtration of milk has provided customers with a longer shelf life of the product. This technology is significantly more expensive than regular pasteurisation, however it has provided a substantial benefit to customers, hence it has been a successful product development.

4.1.3 Entrepreneurial Orientated

Several research articles suggest that firms with an entrepreneurial orientation as they are more likely to innovate boldly, show market leadership, and take considerable risks in their product-market strategies.

The study carried out by Salavou and Lioukas (2003) found that the entrepreneurial qualities of pro-active behaviour and a risk taking attitude were more likely to bring about radical product innovations (as opposed to incremental innovation) than either a market or technology orientation.

This view was supported by O’Regan (2005) when 1000 SMEs in the UK engineering and electronics manufacturing industry were studied. It was found that prospectors (entrepreneurial focused companies) were more likely to introduce a new product, compared to defenders (Internal focused firms that
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avoided unnecessary risks) and were found to be more likely to modify an existing product.

Jones (1998) has carried out a great deal of research into the effect of an entrepreneurial culture in SMEs. An entrepreneurial culture is defined as:

‘the ability to adopt new working practices within the organisation as well as introducing new products and services....As a consequence innovation becomes the responsible of everyone within the organisation rather than being concentrated amongst senior managers and technical staff. This is essential if small manufacturing firms are to continue to contribute towards economic activity in the U.K.’ Jones (1998)

Entrepreneurial culture has been contrasted with segmentalism culture:

Segmentalism culture: This leads to structural barriers and problems being solved by individuals with no collaboration of others.

Entrepreneurial culture: This is typified by an integrative approach that emphasises the importance of conceptual unity. It requires three managerial skills not found in a segmented culture:

- Power skills to persuade others to invest time and resources in entrepreneurial initiatives.
- Ability to use teams and create a high levels of employee participation
- The ability to integrate individuals and micro-changes resulting from the strategic orientation.

One view represented in literature is that most mature companies hold the following perspectives that restrict the company’s growth:
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'mangers believe the industry is stable with slow demand growth and incremental changes in technology' (Baden-Fuller and Stopford, 1994).

These researchers point out that in the mature sector, managerial choice rather than industry structure is in their opinion the most important determinant of profits and growth.'

Five features of an entrepreneurial culture have been outlined by Jones (1998).
These are:

Team work: the ability of individuals to work together in to solve difficulty problems regardless of their hierarchical level or functional position.

Aspirations: The desire to resolve challenging problems, in contrast to a culture that avoids resolving difficult problems.

Willingness to experiment: Organisations need to be experimenting with ways to continually improve how and what they do. This requires managers to plan, experiment, assess and adjust according to the new knowledge gained. A healthy innovative culture must accept that some projects will fail or be rejected in the process of product development (Jones and Craven, 2001).

Capabilities: Organisations need to be aware of their current capabilities and be constantly attempting to expand their expertise and knowledge base.

Dilemmas: All firms face dilemmas such as meeting cost and quality requirements, fulfilling customer orders by outsourcing or producing in-house, having autocratic or democratic decision making processes and so on. According to Jones (1998) firms that have entrepreneurial culture are committed to find the answer to difficult dilemmas such as these and do not see decisions such as cost versus quality as mutually exclusive objectives.
Earlier research carried out by Amabile et al. (1996) into the link between creativity, innovation and culture advocated similar attributes to achieving creativity and innovation:

**Encouragement for creativity:** define problems and provide clarity of goals and open and democratic decision making, as well as encouraging individuals with suitable rewards when they engage in innovative behaviours.

**Autonomy and freedom:** Employees need to have the freedom to choose how tasks are achieved, as this provides a strong sense of ownership and control.

**Resources:** Adequate resources of all kinds (finance, human, time, and equipment) are needed to reinforce that the project is valuable to the organisation.

**Pressures:** A balance is needed between providing challenging work for staff and not overloading them with too much to do, as this leads to excessive stress and in turn undermines innovatory activities.

**Lack of Organisational impediments:** Factors that can block innovation activities can be related to the mentality of those in the organisation. Examples of this are internal dissension, excessive conservatism and highly authoritarian managers.

Jones (1998) references this research carried out by Amabile et al. (1996) and adds that stake holding and information technology need to be added to this list of factors that influence innovation.

**Stake holding:** this is the concept of ownership and commitment to the success of the company by both employers and employees. Jones (1998) promotes shareholdings to be made available to staff as a way of achieving long term
staff commitment in the success of the company, as well as enabling personnel to influence financial decision.

Information Technology: Jones (1998) advocates the use of information systems such as e-mail, ‘group ware’, and business management systems as this technology promotes open communication.

4.2 **Defining Strategic Direction Through a Product Innovation Charter**

Product Innovation Charters (PICs) are a way of formally agreeing the intended direction and use of product innovation resources. PICs are by nature a derivative of the mission statement and are used to define the company’s strategic goal of product development and outline the guidelines for achieving tangible results from the product development process (Bart 2002).

The consequence of not using a PIC is outlined below:

Cooper (1993) outlined the consequence of not using a PIC as one which would inevitably lead to a number of ad hoc decisions made independently of one another with little regard to their fit into the company’s long term strategy. This may result in success due to good luck or it could result in the firm developing products in unrelated or unwanted markets.

Bart (2002) found that amongst 86 corporations in North America there were seven categories of information in the PICs that appeared to contribute to organisational success. There were: business definition, specific financial targets, one compelling goal, non-financial performance objectives, areas to avoid, and competitive strategy. The most important component was the competitive strategy.
Cooper (1994) advocates that a unique superior product superior that delivers unique value to the customer be a goal included in the PIC as it was the strongest factor related to the success of new products in a study of 306 firms in the Canadian manufacturing industry.

4.3 STRATEGIC PLANNING TO ENABLE SMEs TO BEGIN TO INNOVATE

Researchers of innovation theory have proposed many links between the corporate organisations culture and the skill-set required to create an environment where innovation flourishes. Hence, there are some guidelines available for senior managers to use in order plan strategically towards an innovative environment. However, there is a scarce amount of information available for managers in SMEs that can guide them towards an environment that promotes product innovation.

Jones (1998) recommended a 'strategic staircase' method in order to move UK manufacturing SMEs from a segmented culture towards an entrepreneurial and innovative culture. An improvement in a company's IT process and the use of IT packages such as e-mail and 'share-ware' is advocated to promote open communication. This argument is built on the premise that the improved IT and communication will lead to improved product quality, and a lower cost of goods and services. Subsequently, Jones (1998) believes that this will enable the company to create innovative products and begin the process of incremental improvements and innovation.

Jones (1998) justified this strategic plan by stating that the creation of cumulative benefits by numerous incremental improvements is a more realistic approach to beginning the innovation process than taking on the risk associated
with the radical innovation strategy based on being ‘first to market’ with an entirely new product of which customers have had no experience.

Jones (1998) draws on conclusions from previous research and original case-study research that took place over a 5 year period in 5 UK SME manufacturers that were attempting NPD. This research found that SMEs engaged in NPD and had used the type of strategic plan that Jones (1998) suggests, were further down the path to building an innovative culture than those who had taken a different strategic direction.

Figure 5 below highlights the spectrum of strategies available to companies that wish to embark on product development. This is a well-known matrix of new product development categories that shows the amount of change brought about by different degrees of development and the various degrees of risk associated with each category. The approaches range from creating simple and low risk product changes to complex and high risk product development.

<table>
<thead>
<tr>
<th>Technology Capability</th>
<th>Product Capability</th>
<th>New To market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same Market</td>
<td>Incremental innovation - small change to the existing product to create a line extension</td>
<td>Type 1 e.g. Improvements, cost reductions and revisions, same product into new market</td>
</tr>
<tr>
<td></td>
<td>Creation of products new to the firm and introduced into existing markets</td>
<td>Type 2 e.g. New products to the company (but not to the world) - products that allow the company to go into new markets for the first time</td>
</tr>
<tr>
<td></td>
<td>Products developed that are</td>
<td>Type 3 Introduction of products new to the</td>
</tr>
</tbody>
</table>
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| new to the world and introduced into existing markets | world and a new market for the company through the use of new technology |

**Figure 5 - New to market product matrix – based on Mosey (2005)**

Mosey (2005) research is based on the holistic approach, and investigated the paths, positions and processes required to create a company’s dynamic capabilities in new product development and consequently creating a competitive advantage.

Mosey (2005) recommended that the literature reflected the following method of improving the process of developing ‘dynamic capabilities’ in new product development:

**Processes:** management and organisational process that enable coordination and learning. This can be achieved by carrying out product development projects in series not in parallel so that the learnings from one project can be applied to the next project, i.e. management processes to coordinate and learn.

**Position:** Probing the future for emerging trends, making the most of technical assets and the company’s market position, i.e. financial and technological assets, and market positions.

**Paths:** Building of partnerships with lead customers to enable the company to be attuned to the changing needs of the customer e.g. partnerships or mergers.

This process allows a company to take small initial steps into the realm of product development, leaning from these experiences and applying the knowledge to subsequent projects.
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Mosey (2005) completed a study of 5 SMEs and found that the most successful companies first gained experience and credibility by transferring their own technologies into new market areas. This was followed by the firms sourcing new technologies to meet emerging needs of existing and new customers. Mosey (2005) also recommended that systemised reviews of learning are essential to enable a company to lean from the new experiences and providing an opportunity for managers to routinely reflect upon development processes.

In summary, Mosey (2005) describes the best practice company as one that has a combination of paths, positions and processes in a dynamic framework. Mosey (2005) proposes that there is no strategy that suits every company but many alternative routes to the desired outcome.

It is possible for SMEs to gain a powerful competitive advantage over their larger competitors by developing new-to-market products utilising novel, and simple technologies through the process of developing a NPD capability and applying these proven strategies (Mosey, 2005).

Both Jones (1998) and Mosey (2005) offer some guidance for creating strategic plans that enable SMEs to begin the process to establish innovation within the company’s normal operations. Both authors recommend a low risk beginning that maximises the learnings from initial projects before launching into more ambitious projects.
4.4 Creating a Competitive Advantage Through Building Skills and Routines to Facilitate Innovation

An innovative culture is by nature very difficult to define. Kanter (2000) characterized it as the sum of the overt and intuitive routines of the company that enables pro-active steps towards the creation of successful new products. Kanter (2000) states that an organisations knowledge, and operational methods can be a great competitive advantage. This claim is substantiated by the following statistics: the contribution of physical assets to the valuation of US manufactures dropped from 63% to 38% in a decade up to 1991 – by implication the non-physical assets rose from 37% to 62%. Kanter (2000) concluded from these statistics that it is more important to focus business development in the areas of the non-tangible competitive advantage rather than building tangible assets such as capital, plant and equipment.

4.4.1 New Routines

Innovation practices must become embedded into the company’s routines before innovative products can become the normal outcome of the product development process.

Jones and Craven (2001) investigated routines that aid product development and suggest that managers’ day to day tasks can include the routine collection of information to aid in product development. Top level managerial support for these routines was encouraged to enable project teams to negotiate difficult situations.

The research findings of Jones and Craven (2001) concur with those of Barnett and Storey (2001) who investigated the link between investment in human
resources and innovative practices. Barnett and Storey (2001) found that firms in the UK manufacturing industry that invest in people and have strong learning and development practices were also successful innovators.

### 4.4.2 Cross Functional Teams

Completing NPD projects by cross-functional teams was found to be a factor that enhanced the success rate and speed to market of new products (Cooper, 1994). The use of cross-functional teams is also mentioned by many other researchers although not analysed directly. Cooper (1994) endorsed cutting across traditional functional barriers and requiring all departments to work together to complete the steps in the product development process. Essential elements to effective teams in the study were:

- The participation of the team members in all aspects of the project (not just each member completing a section independently).
- Dedication to a small number of projects to focus their attention on the outcomes of the project.
- The team being accountable for the completion of the entire project.
- A strong project team leader to lead and drive the project.
- Top management commitment and supported for the project.

### 4.5 Barriers to Creating an Innovation Culture

Changing a company’s culture to being innovative is a huge challenge to any organisation. It requires company members to be willing to break down functional barriers, engage in teamwork, work with new routines, and cope with the influences of external forces on the change process.
Several studies have identified a negative relationship between a company’s age and innovative behaviour. Hurley and Hult (1998) claim that the older the firm, the more bureaucratic and the less receptive it is to innovation.

A study carried out by Matheson and Matheson (1998) identified 14 barriers to implementing innovation best practice. These were:

- **Short – term focus**: confusing urgent tasks with the important tasks. This is often encouraged by reward systems that measure short term results.
- **Perceived difficulties in measurement**: Some companies perceive that it is difficult to quantify the value of R and D; hence they do not attempt to quantify the results.
- **Departmental barriers i.e. ‘silos’**: this is the result of dysfunctional behaviour and internal conflict between departments.
- **Internal focus of the company**: this results in the lack of vital market information.
- **Politically motivated decisions**: this leads to a lack of credibility in the process.
- **Secrecy**: knowledge provides political power; hence individuals and departments keep information to themselves in the attempt to gain more power.
- **Lack of skills to manage projects and carry out the tasks required.**
- **Lack of discipline**: Lack of discipline in the R and D process to kill projects when they do not meet the agreed criteria in the ‘Stage Gate’.
Lack of strategy: This can be born out of a conflict in priorities, a vague vision, or an over-specific long term plan.

Performance metrics are misused: Predictions of the product benefits, such as sales growth and return on investment can be misused and become commitments to perform. Hence if genuine forecasts are not met a project team can be punished instead of being used as an opportunity to learn and improve forecasts in subsequent projects.

Projects can be over-simplified in order to deal with a great deal of data.

Personal agenda and politics are put ahead of company benefits: People are reluctant to progress projects that would cause a change in their personal role or duties in the company.

Jones and Craven (2001) have also identified barriers to product innovation. It was recognised that NPD frameworks take place through the organisations routines and must take into account the social activities of the organisation. Factors that influence these routines are day-to-day problem solving, the political power-bases, self-interest, market dynamics, and conflict between managers and shopfloor workers that influence new product development and the willingness to learn new routines and skills. These factors must be considered when attempting to understand the difficulties associated with innovation management.

The research carried out by Jones and Craven (2001) highlighted the complex and paradoxical relationship between individual actions and the structure of the company that facilitates NPD. It also illustrates the need to take account of the complex social interactions that typify any innovation process.
4.6 THE EFFECT OF MICRO POLITICS ON THE NPD PROCESS

Jones and Stevens (1999) state that micro politics influence the product development framework, and hence must be accounted for in order to truly reflect the challenges faced by organisations. This is in contrast to the other studies which have chosen to ignore the influence of micro politics and have assumed that product development is undertaken in a rational and objective manner.

Micro politics defined by Jones and Stevens (1999) as the actions that occur when managers attempt to gain political power and influence in order to pursue their own individual career interests. Activities that can be politically motivated include the identification of problems to be solved, the consideration of alternative solutions and the introduction of new products and process. Knight and Murray (1994) also agree with this concept and state that micro politics are central to organisational activities.

It is unavoidable that micro politics affect the product development process as NPD is closely linked with the wider managerial issues. These issues are business strategy, organisational structure, human resource management as well as the technical and marketing inputs. Consequently NPD is an inherently disruptive process. Jones and Stevens (1999) identified that NPD projects often aggravate conflicts between different parts of the organisation that have their own priorities. However, despite these valid observations, Jones and Stevens (1999) stops short of providing guidelines for how to take account of the disruptive influence of micro politics in the context of the NPD process.
It has been argued that occurrences of innovation happen against the odds and are catalysed by those who actively encourage equality amounts cross functional team members and are less likely to demand financial justification for an innovation. These managers are by nature deviant political actors who are not prepared to abide by the organisational rules and normal political practices (Shane 1994).

4.7 Innovation Theory Related to SMEs

Price (2003) reviewed the literature available on the application of the innovation theory to a SME in the food industry in Wales. It was concluded that there was a distinct lack of research that has been carried out into the innovation theory in SMEs, and in particular SMEs in the food industry. Instead it was found that research published on the innovation process in the manufacturing sector focuses on the corporate environment.

4.7.1 Strengths and Weaknesses of SMEs

SMEs have different strengths and weaknesses to large corporate companies due to their size and skill base. These differences create different dynamics in the innovation process and can create a competitive advantage if these differences are understood. SMEs have advantages over large firms for the following reasons:

They can achieve more efficient internal communication due to less bureaucracy as there is often one or only a few company sites in SMEs. This means that there are fewer barriers to communication as people are able to talk face to face and do not have the challenges of communicating from remote locations (Jones, 1998).
Managers who want to act as entrepreneurs are able to make an impact and are not constrained by bureaucracy (Jones, 1998).

It has been observed by several authors that SMEs are often not aware of their strengths; instead they can only see their weaknesses compared to corporate companies. These weaknesses include:

- The cost of patent litigation discourages SMEs from registering patents or fighting legal battles if patents are infringed (Jones 1998).

- Lack of technical expertise (Jones 1998).

- SMEs neglect training and education hence they are aware that they are not up to date with best practice (Barnett and Storey 2001).

- Poor external communications (Jones 1998).

- Shortage of finance and inadequate managerial, technological, and financial resources. (Jones 1998)

- SMEs are less likely to be able to support specialists who have a variety of project related skills; instead capabilities are dedicated to tightly defined roles (Price, 2003).

- SMEs are less able to support systems that record data and performance reviews activities, hence it can be difficult to achieve a high degree of learning (Price, 2003).

These weaknesses are compounded generally by a lack of depth in managerial knowledge and skill; as a result innovation management can be problematic for SMEs (Jones, 1998).
It is evident from the literature reviewed that corporate businesses face different challenges to SMEs. Unfortunately, there is a shortage of research papers written about best practice innovation principles in SMEs.

Research papers unfortunately have been most prolifically generated from studies of corporate firms that are not in the food industry. Hence the findings of these studies must be treated with caution when applying the findings to that of an SME in the food industry. Barnett and Storey (2001) stated that 'despite a large and diverse literature on SMEs, interestingly the knowledge-base about how SMEs actually undertake innovation activities remains limited.'

With this in mind, the research undertaken in this study intends to draw on previous research where relevant, and to establish the best practice NPD process for an SME in the Welsh food industry.
5 AIMS AND OBJECTIVES

This thesis has been written in conjunction with a Knowledge Transfer Partnership between University of Wales Institute, Cardiff (UWIC) and an SME food manufacturer in South Wales. This research was part of a larger project to enhance the SME through the transfer of knowledge from the Food Research and Consultancy Unit of UWIC to the manufacturer.

5.1 AIM

To critically evaluate the use of a Stage Gate NPD process against best practice principles in order to determine if it aids successful NPD in the SME business context.

5.2 OBJECTIVES

- To determine the business context, capabilities and approach to product innovation.
- To define in commercial terms a successful NPD process.
- To assess the ability of the Quest process to promote successful NPD, via the development of new products.
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**METHODOLOGY**

1 METHODOLOGY SELECTION

The motivation for this study was to create products that would provide new revenue streams for the Company. In order to deliver successful products, the NPD practices needed to be reviewed and improved. During the course of this study the researcher led the changes in the NPD process and was intricately involved in the change process as well as recording and analysing the events as they unfolded.

With these objectives in mind, a suitable methodology was selected. A specific requirement of this study was for the researcher to lead the change in the NPD process as well as analyse the results of the action taken. This requirement posed specific challenges to the researcher and required a methodology which would enable an objective analysis of the change process.

Three methodologies were evaluated to in order to find the one that best suited this study. These were Case Study Methodology, Evaluation Research, and Action Research.

1.1 CASE STUDY METHODOLOGY

Case study methodology is commonly used for research programmes, implementation processes, and organisational change. It is used in education, business and social science fields of research. A benefit of case study methodology is that it provides a framework to study one aspect of a problem or event in some depth within a limited timescale (Bell, 1999).
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Yin (1989) explained the methodology as an empirical inquiry that investigates a contemporary phenomenon with its real-life context. This method of enquiry is relevant when the boundaries between phenomenon and context are not clearly evident.

This methodology requires multiple sources of evidence to be systematically gathered. The data collected is often qualitative, and generally takes the form of interviews and observations. Case study research requires a close relationship between the researcher and subject and results in the collection of rich data pertaining to interactions between people, processes, and events (Bell, 1999).

The end result of case study research is often the identification of factors that have had an impact on the event or process studied. Case studies are able to provide a three dimensional view of an event, including the relationships, micro political issues, and patterns of influence in a particular context (Bell, 1999).

Critics of this method point out that it is open to biased interpretation of events and can result in the distortion of the facts. Opponents of this method also state that the sample size of events or issues investigated in case studies is too insignificant to allow the findings to be extrapolated to a larger population (Bell, 1999).

In defence of the case study methodology Miller and Brewer (2003) state that all research methods depend upon the skill of the researcher, the context of the research and the subject of analysis. Hence they defend case study methodology as having no less inherent rigour than any other methodology.
Despite the defensible merits of case study methodology, it was not used in this study as it does not allow the researcher to be intrinsically involved in the event or process being studied.

1.2 Evaluation Research

The focus of evaluation research is to determine the merit, or value of an established policy, planned intervention, or implementation of a new process. Emphasis is placed on providing practical knowledge to aid the decision-making process; hence it is used frequently within the discipline of social science research (Clarke, 2000). This methodology is applicable to the business management contexts of this study as the objective is to evaluate the effectiveness of the Quest NPD process in order to decide if this is a useful process to use for all NPD at the company. This view is confirmed by Cronback, (1982, p.5) who states that ‘...literature on evaluation speaks of it as an attempt to serve a decision maker.’

Methods of inquiry are both quantitative and qualitative, and include auditing, monitoring, interviews, observations, inspections, and reviewing documentation. There is, however, a strong emphasis on qualitative data collection, and a focus on three categories of questions: descriptive, normative, and cause-and-effect (Clarke, 2000).

Evaluation research can take either a formative or summative approach. Formative research focuses on identifying the strengths and weaknesses of a programme or process and is focused on process improvement. The summative approach aims to determine the overall effectiveness of a project or programme, and is conclusion orientated (Clarke, 2000).
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The evaluator in this study is the researcher within the company. Feek (1998) and Love (1991) outline the advantages and disadvantages of using an internal evaluator:

**Advantages:**
- Familiarity with the history, background, politics and issues of the organisation.
- Likely to focus on the central concerns of management.

**Disadvantages:**
- Having a vested interest in a particular outcome.
- Likely to be over-influenced by the known views of management.
- Find it difficult to encourage stakeholders in their own organisation to actively participate in the evaluation process.

This study required the strengths and weaknesses of the NPD process at the company to be identified as well as the overall effectiveness of the process, i.e. both summative and formative, hence the evaluation research methodology would need to be adapted if it were to be used in this study.

Evaluation research can be used by impartial researchers outside the organisation who observe the changes, or by those within the organisation with first hand experience of the changes taking place. However this approach does not allow the researcher to take part in the change process itself. Hence, this methodology was not selected for this study.
1.3 **ACTION RESEARCH METHODOLOGY**

Action research methodology was selected for this study as it suited an environment where the researcher was part of the system that was analysed. This method is significantly different from evaluation research and case study methodology and involves a greater amount of reflective learning.

Action research is a form of science that differs from the model of experimental physics but is genuinely scientific in its emphasis on careful observation and study of the effects of behaviour on human systems (Coghlan and Brannick, 2001).

**1.3.1 Strengths of Action Research Methodology**

This methodology had advantages over the other methodologies reviewed. Its strength is the guidelines that are provided in relation to the objective collection of data and analysis given in circumstances where the researcher was integrally involved in the process that was being studied. This methodology can be appropriate to the context of business, management, education, health and social welfare.

A fundamental difference in the focus of action research compared to other scientific methodologies is that research that is undertaken via this method attempts to validate theories through practice i.e. the theory is developed as the events unfold. The value of the work is judged by the understanding of, and the desirable change in the practice that it achieved (Bell, 1999). This is the reverse of other methodologies that first validate the theory independently then attempt to apply it to practical situations.
Action research methodology is a well established method that takes advantage of the ‘insiders’ (i.e. the researcher’s) existing role within the company structure, the access to information, the insight into the decision making process, and the position of the researcher to gain valuable insight into a company that would not be possible through other forms of research. Action research makes use of formal and informal relationships through which the researcher interacts, as well as their understanding of company politics. All this adds to the ability of the researcher to understand the way decisions are made, how and why events take place, and their relationship to existing or emerging theories.

This is ‘first person’ research where the researcher experiences the issues first hand. Hence, they get a better view of the issues than what would be achieved by ‘third person’ research from outside of the organisation. However there are also some inherent weaknesses in this methodology.

1.3.2 Weaknesses in the Action Research Model

Every methodology has weaknesses that must be taken into account when undertaking a research study. An inherent weakness of action research is that the researcher is so close to the data and the company that assumptions may inadvertently be made during the study, and could result in some issues not being as fully investigated as they would have been if an outsider were to conduct the study. There is also the likelihood that a pre-existing bias towards members of the company could lead to biased analysis of events that took place.

In order to achieve maximum objectivity in this study, the inherent weaknesses of action research methodology were accounted for. This was carried out by
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completing the following steps as recommended by Coghlan and Brannick (2001):

- Assumptions were explicitly stated at the beginning of the research and tested during the project.
- Multiple data sources were used to provide a broad base of evidence. This minimised any bias in the interpretation of data.
- The findings of the action research study were compared to existing theories to evaluate how this research fits into the context of existing knowledge.

It has been stated that action research methodology is a normal and natural research paradigm with a long tradition and adequate rigour to produce valid results. Coghlan and Brannick (2001) emphasise that this style of research is based on a collaborative problem-solving relationship between the researcher and the client, with dual purposes of solving a problem and generating new knowledge.

Action research takes the form of two learning cycles called 'Cyclical learning methodology' and 'Meta Learning'. These learning cycles take place in parallel and require the input of individuals, project members and the wider organisation.

2 CYCLICAL LEARNING METHODOLOGY

The cyclical learning process consists of several steps, namely; diagnosing the issue, planning action, taking action and evaluating the action taken. Throughout the study these steps were carried out to glean information about
the NPD process and the organisational context in which it operated (Coghlan and Brannick, 2001).

The theory of cyclical learning was used to diagnose the issues apparent at the outset of the project, planning the action to achieve each objective, carry out the agreed action, document what happened, reflect on the events and contribution factors, and to extrapolate useable knowledge or theory from the evaluation of the events.

The result of this process was that the practical and theoretical knowledge from one cycle of learning became the basis for the next cycle of learning. In this way practical and theoretical knowledge grew as the project progressed. (Coghlan and Brannick, 2001)

2.1 Diagnosis of the Issues

Diagnosing the issues that the research was to address, involved identifying the issues that formed the reason for the actions e.g. issues such as available resources were considered as the lack of resources could have caused a deviation from best practice NPD process. This step involved the articulation of the theoretical foundation for action and was carried out with careful consideration.

It was accepted that the diagnosis of the issues involved in the research were likely to change during subsequent steps in the learning cycle as the project progressed. It was acknowledged from the outset of the project that at such a time when this happened, the change in project direction was recorded and the evidence and rationale for the new diagnosis was recorded e.g. when the company strategy for NPD changed.
Diagnosis was a collaborative venture; as such it was essential that it involved the action researcher and other relevant stakeholders such as senior management at the company.

2.2 PLANNING ACTION

This stage follows on from the analysis of the context and purpose of the project, and the diagnosis of the issues that needed to be addressed. As such, it involves the planning of the action that was needed.

2.3 TAKING ACTION

The planned action was taken according to the plans made in the previous step. The actions were dependent on the organisational members playing their part in the research project. As this was a learning process for all concerned, it was expected that the completion of tasks would improve as the project progresses.

2.4 EVALUATING

This was the comparison to the original diagnosis and the outcomes of the action, as well as a critique of the plans made and actions taken. This stage fed into the next diagnosis stage in the learning cycle.

3 META LEARNING

Meta learning is a research cycle that operates in parallel to the learning cycle described above. The purpose of meta learning is to inquire into the progress of the research project and what the researcher has learnt from the experience. This is a cycle of reflective learning about what happened in each step of the research.
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It is the dynamics of the meta learning process that enables action research to be more than just everyday problem solving. In essence, it is learning about learning.

Mezirow (1991) identified three forms of reflection:

- **Content** – thinking about the issues and what is happening etc.

- **Process** – thinking about the strategies, procedures, and how actions have been taken.

- **Premise** – reflection and critique of the underlying assumptions and perspectives. For example, the culture of an organisation or subculture of a group working on a project have a powerful impact on how issues are viewed and discussed without members being aware of it (Schein, 1992).

The process of investigating these elements is called a 'meta cycle of inquiry' and is very important for discovering new knowledge about the organisation. This process was not limited to that of the researcher's own self-reflection but one which also required the input from other members of the project team. Reflection from team members allowed an opportunity to record what had been learnt in the process of carrying out tasks, managing communication within the team, solving problems, and resolving conflict (Schein, 1999).
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The combination of the learning cycle and the meta cycle of inquiry has been depicted as shown in figure 6 (Coghlan and Brannick 2001):

![Diagram](image-url)

**Figure 6 - Organisational Dynamics of Action Research**

(adapted from Coghlan and Brannick, 2001)

The diagram depicts the learning cycle and the interactions between individuals, teams, inter-department groups and the organisation as a whole and their interaction with the process, content and premise during the study.

In order to examine the interactions between team members, it was important that individuals were not blamed for issues that arose, but drew on those experiences to reach a greater understanding of the interaction between people with differing mindsets and political interests, as well as the assumptions that individuals, teams and the organisations hold.
4 Political Interactions Between Research and the Company

Carrying out any research in an organisation is very political. However doing research in ones own organisation is particularly so (Punch, 1994). Power struggles and subversive action can interfere directly or indirectly with the study. Coghlan and Brannick (2001) recommend that a researcher must be politically astute in the way in which they interact with other company members in order to combat political pressures.

Political forces can have a significant positive or negative influence on organisational change. When the diagnosis was undertaken (the first step in the action research cycle) it was carried out with the knowledge that it was a highly political act as the outcome was likely to affect the stakeholders in varying ways. Some may have benefited, while others may have been reproached if the research exposed weaknesses in performance. Therefore, while diagnosing the issues was a collaborative activity, it had to be accepted that this process raised questions and applying judgements to particular issues were likely to have severe political implications (Coghlan and Brannick, 2001).

Action research by its very nature challenges the existing organisational norms, rituals and beliefs. While the aim of the study was to generate valid and useful information in order to facilitate informed decision making and improved practices, the question of what constitutes valid information will always be an intensely political issue (Kakabadse, 1984).
5 Ethics of Action Research

Action research methodology is built on the principle that the researcher participates within the system that is being studied. Ethical considerations of this study relate to authentic relationships between the action researcher and the participants in the research - the individuals, groups and the organisation. There was a need for ‘mindful inquiry’ i.e. the consideration of the possible effects on the inquiry’s participants, the researcher, and on the potential future relationships between the researcher and the participants (Bentz and Shapiro, 1998). Ethical issues that were considered as recommended by Coghlan and Brannick, (2001) were:

- Negotiating access with authorities and participants.
- Promising confidentiality in respect to information, participants’ identity and the data.
- Ensuring participants have the right to not participate in the research.
- Keeping relevant others informed.
- Getting permission to use documentation which was produced for other institutional purposes.
- Maintaining your own intellectual property rights.
- Keeping good faith by showing you are someone who can be trusted and checking with others for any misunderstanding.
- Negotiating with those concerned as to how the descriptions of their work and points of view will be published.
6 METHODS OF INQUIRY

Action research methodology has been used to investigate the aim and objective of this study. The methods of inquiry that were available to the researcher were:

Quantitative

Return on investment analysis - this was a calculation of the amount of time it would take to pay back the investment made in the development of a product.

Product sales information – this information was used to evaluate the success of a product against the estimated sales volumes set in the development phase.

Qualitative

Project plans and NPD process model – this was compared to what actually happened via the qualitative methods described above.

Research documentation: a formal document was co-written by the company and by UWIC to agree the project objectives.

Company historical and business structure information – this was obtained from the company to provide the context for the research. This information included the organisational chart, age of the company, product range, and the customer base.

Observation: Observations of interactions between team members were recorded to create a narrative of the events that took place. This formed the basis for the meta cycle of inquiry.

Meeting minutes: these were recorded by either the researcher or by an independent observer to record decisions made and the actions agreed.
Interviews: due to the highly political nature of the research, formal interviews with transcripts were not used. This decision was made after several discussions with organisational members who had a key influence on the research. It was decided that interviews would not produce accurate representation of the views of organisational members, as they did not feel comfortable having their views recorded and transcribed. Given this environment, interviews were likely to produce false results as staff were likely to say what they thought they were expected to say. Instead of using formal interviews the researcher observed the company members comments during their work and in project meetings. In this way, their opinions were recorded, albeit in a more indirect format.

6.1 OBJECTIVE 1 - TO DETERMINE THE BUSINESS CONTEXT, CAPABILITIES AND APPROACH TO PRODUCT INNOVATION

Literature suggests that there are many organisational factors that affect the outcome of the NPD process. These factors are influenced by the company size, age, capability and approach to problems that occur during the NPD process. For example, Jones (1998) outlines the problems faced by SMEs due to the inherent lack of depth in managerial knowledge and skills and contrasted them to the problems of excessive bureaucracy faced by managers in larger organisations.

The 'diagnosis' step in the learning cycle, and the meta cycle (process, premise and content) were used to investigate this objective.
Data Collected

- A description of the history of the organisation gained from informal interviews with managers and staff.
- Organisational structure – this was outlined as it influenced the organisational culture.
- Explanation of the relationship between the Knowledge Transfer Partnership (KTP) and the company.
- Business size and market share in comparison to its competitors.
- SWOT analysis i.e. the analysis of the strengths, weaknesses, opportunities and threats – this provided the background and understanding of the environment in which the company was working. This analysis covered the strengths, weaknesses opportunities and threats faced by the company. The analysis showed the company's internal resources and structure as well as the external conditions and competitors.
- Company documents that show how NPD fits with the company strategy.
- The company's motivation for carrying out this research – this was formally documented in the KTP proposal.
- Relationship between KTP, UWIC and the Company to show ‘power’ relationships and the position from which the research was able to influence the company.
- Assumptions made at the beginning of the research including assumed strengths and weaknesses. These were tested though the research process.
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The meta cycle of learning was used to assess the capabilities, preconditions and assumptions the company held, and the project teams approach to the NPD process at the outset of the project.

6.2 OBJECTIVE 2 - TO DEFINE SUCCESS IN RELATION TO THE NPD PROCESS

Literature suggests that there are many factors that influence the launch of a new product, one of which discussed is the NPD process. The purpose of this objective was to define a meaningful criterion of success in relation to literature, and in relation to the views of the company. Once this objective was completed the researcher was able to evaluate the Quest process in order to find out if it aided the success of the NPD process.

Data Collected

- Company views in regards to what constitutes a successful process were captured in the formal documentation of the KTP proposal and informal conversations with senior management.
- Literature was reviewed to establish the views of other researchers
- Meta learning cycle: process, content and premise via observations and records of conversations with key personnel. The theoretical criterion for success was put in context with the expectations of the company members.

6.3 OBJECTIVE 3 - TO ASSESS THE SUITABILITY OF THE QUEST PROCESS TO THE COMPANY

This objective was completed by using the entire learning cycle – diagnosing, planning, taking action and evaluating. Through this method, the ability of the
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Quest process to deliver successful new products was assessed. There were three product development projects investigated, all were part of the 'Health Milks' product development project.

Data Collected

**Diagnosing** - A comparison between what was achieved via the company's existing NPD process, best practice literature and what was achieved.

Planning Action - Project plan

**Taking Action**

- Chronological narrative based on the researchers observations and supporting documentation to describe what took place and the time periods in which this happened.

- Meeting minutes of the Local Management Committee (LMC) and the KTP Technical meeting.

- Return on investment analysis.
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Review of Action Taken

Review of the progress made compared with the original objectives.

The meta cycle of learning was also carried out in order to consider the process, content and premise of the objective.

*Figure 7 - Summary of the research steps taken to gather the data – put this below the table as you have in the others*

<table>
<thead>
<tr>
<th>Cyclical Learning Methodology</th>
<th>Meta Learning Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective 1 To determine the business context, capabilities and approach to product innovation.</td>
<td></td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Process</td>
</tr>
<tr>
<td></td>
<td>Content</td>
</tr>
<tr>
<td></td>
<td>Premise</td>
</tr>
<tr>
<td>Objective 2 To define ‘success’ in relation to the NPD process success.</td>
<td></td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Process</td>
</tr>
<tr>
<td></td>
<td>Content</td>
</tr>
<tr>
<td></td>
<td>Premise</td>
</tr>
<tr>
<td>Objective 3 To assess the suitability of the Quest process to the company through using it to develop new products.</td>
<td></td>
</tr>
<tr>
<td>Healthy Milks NPD:</td>
<td></td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Process</td>
</tr>
<tr>
<td>Review</td>
<td>Content</td>
</tr>
<tr>
<td>Planning</td>
<td>Premise</td>
</tr>
<tr>
<td>Action</td>
<td></td>
</tr>
</tbody>
</table>
RESULTS AND DISCUSSION OF OBJECTIVE 1:

TO DETERMINE THE BUSINESS CONTEXT,
CAPABILITIES AND APPROACH TO PRODUCT INNOVATION

1 INVESTIGATION INTO THE BUSINESS CONTEXT OF THE RESEARCH

It is important to understand the business context within which this research took place. The elements that make up the business context: company history, culture, organisational structure and the project team structure all have a bearing on the way decisions are made and consequently the project outcomes. These influences can also be compared to the business context of companies studied by other researchers and comparisons made between the outcome of previous research and the outcome of this project.

1.1 HISTORY OF THE ORGANISATION

The company which took part in this research was an SME with a long history of steady growth. Since its inception in 1949 it has changed hands several times. The company began as a family business supplying products to the local community of South Wales. There was steady growth in revenue until 1991 when the company was bought out by a larger company. Over time, the product range expanded to meet customer demands. However, it remained in
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essence a supplier of commodity products. The dairy was owned by the corporate group for 10 years before it was sold to an independent group of shareholders.

This company is defined as a SME (Small to Medium Size Enterprise) as it has less than 250 employees (Department of Trade and Industry 2007). Current staff numbers are approximately 200 and in the financial year before the project started it had a revenue of £22 million.

The company holds a strong position in the market place. Its customer base consists of a wide selection of customers from small retail outlets to medium sized supermarkets, independent retailers, public sector contracts, food manufacturers, agents and wholesalers. It has chosen to specialise in seven day delivery to small volume customers, as well as large volume delivery to central distribution points.

In the wider context of the UK dairy market (i.e. including the supply of dairy produce to the multiple retailers) this company is a small player and the only independent dairy company in the South East Wales. Its competitors compete for market share of the semi-retail business however they are more focused on the multiple retail trade.

It has a portfolio of approximately 150 products, and has a distribution area including West Wales, South Wales and West England.
1.2 Organisational Structure

The company has a very flat organisational structure, hence to solve problems and make improvements that affect more than one department, it is necessary for the management team to work as a team, as the hierarchy is not designed for clear lines of authority to push through decisions and action.

1.3 Relationships in the Knowledge Transfer Partnership

The relationships depicted below show that all managers are equal in the business. Hence decision making by consensus was the most common way that progress was made in this project.
The Project is overseen by

**KTP Associate**
(Researcher)

Objectives: To carry out defined objectives

Body of work required to meet all stated objectives within budget and time scale – Objectives met by Associates work

**Business – Managing Director**
Defined KTP objectives & benefits

---

**1.4 THE COMPANY’S OBJECTIVES FOR THIS PROJECT**

'The proposed partnership will move the company into a growth market and help it to become a key regional player in the further processed milk based products' (reference from the formal KTP proposal document – section 4.11 page 16.)

The company’s aspirations for this project were:

- The company securing a contract with a multiple retailer for added value products and consequently create new streams of revenue...‘the launch of 5 new products during the second year of the programme’ (KTP proposal 4.13 page 16).

- Use product development process as a vehicle to gain an ‘...improved understanding of target marketing and thus more focused marketing materials’ (reference KTP proposal 4.13 page 16)
To enable the company to keep up with the pace of change that is happening within the food industry i.e. as a means of survival due to the market pressure that was reducing margins and increased the company’s reliance in the commodity market. ' (LMC 2 Project Meeting Minutes, 5/10/05, Appendix 5)

### 1.5 PRODUCTS SELECTED FOR DEVELOPMENT

<table>
<thead>
<tr>
<th>Product</th>
<th>Product Description</th>
<th>Perceived potential market at the beginning of the project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relaxing Milk</td>
<td>Flavoured milk (e.g. chocolate, vanilla and honey) with the addition of Kava (a herb known to have relaxing properties). This drink would be an aid to relax or sleep.</td>
<td>To cater for the consumers who feels the pressures of a fast past lifestyle and wants an aid to relax. Customers will be middle age to older.</td>
</tr>
<tr>
<td>Balancing Milk</td>
<td>Pasteurised milk with added Inulin (a compound known to aid good bacteria in the gut). To be used in everyday applications the same as white milk.</td>
<td>Middle aged to older consumers interested in improving their digestion in without having to take a Yacult type product.</td>
</tr>
<tr>
<td>Flexi Milk</td>
<td>Pasteurised milk with added Omega 3, vitamins A &amp; D, and Glucosamine (compounds proven to help joint health).</td>
<td>Middle age to older consumers concerned with arthritis and mobility.</td>
</tr>
</tbody>
</table>
See appendix 6 for further details.

## 1.6 Qualitative Analysis - Meta Cycle of Learning

**Reflecting on the Capabilities, Pre-conditions, and Assumptions That Exist Before the Project Began**

In order to gain new knowledge from the action research process the researcher engaged in the meta cycle of learning. This learning process was initiated with observations and informal conversations with project team members.

### 1.6.1 Process

The agreed process for product development during this research project was the company's in-house document - called Quest (see Appendix 1). This process had been used by previous management when a publicly listed company had owned the company. It was assumed that the Quest process would have a positive influence on the success of the NPD as it was obtained from a successful corporate company – however this assumption was to be tested by this research project.

Additional to the Quest process a project plan was created that included a timeline of tasks to be completed (see Appendix 2). This plan was the result of discussions between the university and the company and it was acknowledged by the project team that a project plan would aid the success of the project.

### 1.6.2 Content

The content of project plan reflects the company's strategic goals and the beliefs and opinions of the project team members. As stated above, the
company considered the success of the project to be the achievement of its strategic goal to acquire a contract with multiple retailers for added value products, hence the project plan reflected this.

This NPD strategy had been determined from the findings of a market research report carried out by independent consultants. This occurred before the research project began and, as a consequence this project began with the assumption that the consultants had recommended an NPD strategy that suited this company’s capabilities and current market conditions.

The project team identified several factors that the university could provide that they believed were important to the success of the NPD project:

- Technical capabilities to create the products.
- Market research expertise.
- Project planning and reporting processes.
- Research funding to complete the project.

This was documented in the KTP Proposal and Application Form as follows:

- Access to a continued partnership with dairy experts at the university.
- New product development procedures will be developed to all key personnel.
- The chemistry of existing products and interactions with additives will be clearly understood.
- Legislation in added value milk based products will be embedded into company procedures.
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- Improved analytical skills related to marketing techniques.

(KTP Proposal and Application Form - Section 4.15 and 4.16)

Other factors that were already in place within the company were:

- Engineering expertise and physical resources to construct or acquire the processing plant for the new products.

- Sales resources to promote the product – provided in part by the company. However it was acknowledged that there may be a need for more resources in this area.

This identification of factors reflects the project team’s level of knowledge and understanding of the NPD process and their awareness of factors that influence success. The factors identified by the team are not focused on in the literature review as these skills are the basic requirement of NPD and are taken for granted in corporate companies where research generally takes place. However, several research articles have mentioned the common weaknesses of SMEs in relation to innovation:

- Lack of technical expertise (Jones 1998).

- SMEs neglect training and education hence they are aware that they are not up to date with best practice (Barnett and Storey 2001).

- Shortage of finance and inadequate managerial, technological, and financial resources (Jones, 1998).

- SMEs are less likely to be able to support specialists who have a variety of project related skills; instead capabilities are dedicated to tightly defined roles (Price, 2003).
• SMEs are less able to support systems that record data and performance reviews activities, hence it can be difficult to achieve a high degree of learning (Price, 2003).

It was observed that the factors that the project team identified as contributing to the success of this project are indeed the same factors that are often missing from SMEs and consequently restrain innovation in SMEs.

1.6.3 Premise

The perspective of the project team members and the assumptions that they make have a significant effect on how issues are viewed and discussed. Consequently, the outcome of the project can be influenced by these factors without members being aware of it (Schein, 1992).

The perspectives that the university team members brought to the project were influenced by their experience providing technical support for NPD and technical issues in SMEs in the food industry of Wales. Hence, these team members were aware of the possible problems and challenges SMEs faced when undertaking NPD.

The perspectives that the company representative brought to the project team was a strong understanding of the existing business and present capabilities and a willingness to use the NPD process to evaluate its usefulness first hand. The company had not used a formal NPD stage gate process before i.e. one product had been created at the company several years ago via an intuitive ad hoc method.

There was a perception by the project team that the project may encounter a lack of marketing skills. However, the Managing Director believed that this
could be a good opportunity to learn from the university representatives which could result in the company becoming stronger in this area of competency.

The perspective of the researcher was formed from experience in a corporate food company with an established NPD process and a long history of success. The researcher was well acquainted with the NPD process, creating and using project plans and facilitating team meetings to meet agreed objectives.

It is important to consider the premise of the research before it is initiated. The initial perspectives and assumptions have a bearing on the way issues are approached and decisions made. Consequently, these factors form important parts of the project culture.

### 1.7 Learnings From the Meta Cycle of Learning

The project team began the research with perspectives and opinions brought from their different experiences of NPD and the SME environment. All project members had different past experiences that coloured their expectations and caused them to make assumptions in relation to many aspects of the project.

With the use of the meta cycle of learning, several assumptions were identified:

- Using the Quest process would aid the success of the new product.
- Creating a project plan would aid success as it would be used as a road map which the project would follow.
- The recommendation by the market research consultants to create novel products suited the company's capabilities and current market conditions.
• The researcher assumed that the NPD project plan would be followed prescriptively and that progress compared to the timeline was a key performance indicator.

• The project team assumed that the company's NPD process (Quest) would have a positive influence on the project's success because it was obtained from a successful corporate company.

• The company's management team had assumed that the market was stagnant and that there was not much opportunity to develop existing products or business relationships. This assumption contradicted the opinion of Jones (1998) who believes that the management of the company has a stronger influence on the success of the company than any market conditions. Jones' (1998) opinion was that in the UK's mature manufacturing sector, it was the choice of management in SMEs that had a greater influence on the profits and growth than the market conditions.

• The project team assumed that there were adequate skills and resources available within the team to complete the project.

These assumptions were tested throughout the remainder of the project.

At the outset, the skills of the team were evaluated and it was recognised by the team that the company suffered from the common skill shortages encountered during NPD projects in SMEs. However, the cross functional nature of the team and the external resources available to the project via the university these skills shortages were improved. Skills that existed in the company that were vital to the project were knowledge of finance, manufacturing and distribution.
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Jones (1998) published a study into the innovation culture of SMEs in the UK. This study recommends the promotion of an entrepreneurial culture as it has five features that promote innovation:

**Team work:** people working across functional barriers.

**Aspirations:** The desire to resolve challenging problems.

**Willingness to experiment:** in order to improve the way tasks are achieved and issues resolved.

**Capabilities:** An organisation’s awareness of its capabilities and constantly attempting to expand its expertise and knowledge base.

**Dilemmas:** a commitment to finding the answer to difficult dilemmas and see dilemmas such as cost versus quality as not being mutually exclusive.

In light of the recommendations made by Jones (1998) it appeared that the project team embarked on this project with an entrepreneurial ethos. The resolve of the team to maintain this approach was observed during the progress of the project.

The company representative recognised that there was a lack of marketing skill in the company hence it was hoped that this project would strengthen their marketing competency by learning from the university team members.

The project was embarked upon with an entrepreneurial ethos in line with research by Jones (1998), which was an excellent approach in which to begin the project. The resolve of the team to stay true to this philosophy was tested when difficult decisions were required during the project.
RESULTS AND DISCUSSION OF OBJECTIVE 2

TO DEFINE SUCCESS IN RELATION TO

THE NPD PROCESS

2 DEFINITION OF SUCCESS

2.1 SUCCESS AS DEFINED IN RECENT NPD LITERATURE

There is a general consensus of opinion that successful NPD is a process by which a gap is found in the market followed by the creation of a new product which meets the needs of the customers and provides adequate revenue for the company.

The critical literature review evaluated research in successful product innovation. It was found that the literature suggested successful NPD results in:

- Paying back the capital invested in the NPD (Saban et al. 2000).
- Increased competitive advantage and a route to survival and growth (Cooper, 1993).

2.2 FACTORS BELIEVED TO INFLUENCE SUCCESSFUL NPD:

Innovation management research has identified many factors that contribute to the success of NPD, of which one is the use of a multi-staged NPD process. However, the definition of a successful NPD process is not clearly defined or agreed between researchers in this field.
Price (2003) summarised the measurements for successful NPD process as follows:

2.2.1 Short Term Measures

Post-process metrics:

- Timeliness of a project to meet all the stated objectives, and the variance from the original budget.

In-process metrics:

- Quality of gate meetings and deliverables.
- Degree of deviation from the New Product Process Rules e.g. change of the product specifications after Gate 3, number of cancelled or postponed gate meetings, product development projects taking place outside the process.

Projects reaching the gates at the agreed time

Budget performance:

- Percentage of projects to achieve the budget at each stage.

It is worth noting that these short term measures do not measure success. They measure how closely a company is following the agreed NPD process. By implication Cooper (1995) advocates that the NPD process needs to be followed closely for it to provide a successful product. This is challenged by Rudder et al. (2001) as discussed above that believe a company should adapt the NPD process to the individual situation.
2.2.2 Long Term Measurements

Financial: actual profitability vs. predicted or actual manufacturing costs vs. predicted costs.

Success Rate: percentage of products launched that have become a commercial success.

Percentage of sales and or revenue growth from NPD vs. growth targets:
Price (2003) observes that these metrics are financially focused and are common in articles published between 1980 and 1990. Since this time, a more balanced approach has been advocated with the inclusion of non-financial measures such as customer satisfaction and organisational learning.

As outlined above, there is a strong indication that the use of a structured process contributes to the creation of a successful new product, therefore, contributing to meeting the criteria for NPD success as a whole.

2.3 THE COMPANY’S VIEWS OF SUCCESSFUL PRODUCT DEVELOPMENT

Successful product development in relation to this project was defined as the creation of 5 new products, a contract with multiple retailers during the second year of the project, and the contribution of these sales to an increase in profit. (KTP proposal p16, section 4.13). This would result in:

- New revenue streams- this was important as the existing revenue streams were generated from products sold in the commodity market hence did not provide much profit.
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- New customers – this was essential as the existing customer base is under threat from companies based in England who were offering them a heavily discounted milk price in order to convince the customer to change suppliers.

- A broader product portfolio to include added value products to complement the existing white milk and cream sales. This would enable the Company to offer a greater selection of product to their existing and new customers.

In more general terms, the NPD project was aimed at meeting some of the strategic goals of the business. In the 2004 business plan these were to:

- Drive the innovation process.
- Advance business excellence.
- Identify / explore partnership relationships.
- Drive continuous business improvement processes.
- Increase new product development / introduction activities.
- Improve the ‘skill’ base within the workforce.

(Company Business Plan budget 2004)

3 ANALYSIS

3.1 COMPARISON BETWEEN WHAT THE COMPANY AND THE LITERATURE DEFINE AS A SUCCESSFUL NPD PROCESS

Understanding the company’s definition of successful NPD brings an understanding to the motivation that drives the decision making process during this project.
The company defined a successful product launch (and by implication a successful NPD process) to be the acquisition of a contract with a multiple retailer. This end result is the consequence of not only the NPD process being successful but also the marketing and advertising presentation and a multiple retailer buyer deciding to list the product – factors that may be outside the control of the company.

While this definition is very specific and easily measured, it is not specific to the NPD process. Instead it would be the result of several factors working in the favour of the company. Some of these factors are within the control of the project team (e.g. the decision made during the NPD process) while other factors (e.g. the decision made by the multiple retailer when they evaluate the product concepts) are out of the control of the project team.

In comparison, literature suggests several more general measurements that can be used to indicate success of NPD in general. These can be short term or long term measures and include both financial quantitative objectives and strategic qualitative objectives (Price, J., 2003).

From this analysis, it was concluded that both the company's approach and the literature do not differentiate the success of the NPD process from the success of the product launched. Hence it was concluded that the success of the NPD process is only one of the factors contributing to the NPD project as a whole and it is only the success of the whole project that can be measured.
RESULTS AND DISCUSSION OF OBJECTIVE 3 -

TO ASSESS THE ABILITY OF THE QUEST PROCESS

TO PROMOTE SUCCESSFUL NPD VIA THE

DEVELOPMENT OF NEW PRODUCTS

1 RESULTS - CYCLICAL LEARNING

1.1 DIAGNOSIS – THE THEORETICAL FOUNDATION FOR ACTION

The diagnostic stage of the learning cycle involves consideration of the reasons for assessing the suitability of the Quest process to the company. Researchers of innovation management recognise that a stage gate process is a key factor in the success of the NPD process (Cooper, 1994). Hence this would suggest that a process like the Quest could have a positive influence on the success of the business if it led to products being successfully launched. It could become a core process in the company and result in the creation of many more successful products that delivered the profit margins and strategic objectives desired.

The suitability of the Quest process in the company relies on two factors:

Firstly the human resources and skills to carry out the process - the Quest process requires four stake holding parties; namely the New Products Steering Group (NPSG), the Project Team led by the Project Manager and the Process Owner. Given the simple organisational structure of the company that took part in this study, the tasks allocated to these stakeholders would need to be carried
out by a small group of people; it would require individuals to have several roles during the NPD process. The effect of this was observed during the study.

Secondly, the acceptance of this process by the company was dependent on the Quest process prescriptive format being considered to be more beneficial than the current intuitive approach to NPD.

1.2 PLAN OF ACTION

The project plan was created by the university team members and can be found in Appendix 2. The plan was created by the team members from their experience of previous NPD projects and the understanding of the demands of the Quest process.

This plan of action includes the detail of the tasks required, time frame of events and responsibilities of those involved.

1.3 ACTION TAKEN

1.3.1 Idea Generation and Screening

The idea generation and screening was carried out in a project meeting on the 26/06/04. During this meeting constraints of the products were agreed and product ideas were discussed. The team agreed on four product concepts flexi-milk, relaxing milk, balancing milk and flavoured milk (see Appendix 3). However flavoured milk was considered outside the scope of this project as it was a re-development of an existing product.

The idea generation and screening stage was a condensed version of the Quest idea generation stage which it recommends should take three weeks and encompasses four stages (see Appendix 1 - Quest process).
1.3.2 Concept Phase

The Concept Phase was completed via a market audit process. This format differed from the Quest process but covered many of the same elements. This deviation from the Quest process was taken as it was considered that the market audit was a superior process as it was a more thorough way of analysing the factors that could contribute to the success or failure of the product concept such as the external and internal factors, economic, social, technical, legal and environmental issues, competitors and the potential reaction from competitors. This phase took eleven weeks to complete (more than twice the time recommended by Quest) due to the market research information being very difficult to find.

The three healthy milks (flexi, balancing, and relaxing) were analysed in this phase. The flavoured milk that was identified in the idea generation stage was dealt with separately as it was a re-development of an existing product. The market analysis found that there was a potential market for functional foods such as healthy milks. However, it was also evident that more specific research was required to establish whether consumers would accept the concept of milk with added benefits as a valid proposition.

The competitors' analysis recognised that large corporate food companies were interested in the functional food market. These companies had a great deal of experience and resources and as such if a product launch by the company was successful, it was likely that a larger company would soon launch a competing product which would result in fierce competition.
The investigation into the market mix found that it would be essential to sell these products to multiple retailers to ensure an adequate level of sale. It was estimated that the price point which this product could be sold at would be at least 30% above the RRP for standard milk.

There were aspects of the marketing mix that raised significant concern about the viability of these product concepts. The first of these concerns was the need for a promotional plan to educate consumers of the benefits of these products. Secondly, the lack of clarity in the labelling laws as it provided great uncertainty as to the type of health claim that could be made on the product packaging. Thirdly, it would require a major improvement in the marketing and promotional skills within the business in order to launch these products successfully, as well as a major investment in the production facilities.

The distribution channels were most likely to be via customer depots as this was the common arrangement for multiple retailers as it provided the customer with the control of the distribution chain. This in effect removes control of the distribution channel from a supplier such as the company.

In summary, the market audit found that there was potential for the flexi milk, balancing milk, and relaxing milk products in the UK market, but serious concerns were raised as to whether the products were the right opportunity for this company due to the high risk nature of such a venture and the capital investment required.

As previously mentioned, the Market Audit format was used to complete many of the elements of the Quest Concept phase, as it was thought to be a superior
process. However, there were two aspects not completed by the market audit. These were:

- The marketing task of testing the prototype on target audiences such as internal taste panels, schools, and key user groups. The need for this task is questionable as the philosophy of the Quest Concept Phase is to undertake desk research, and this task cannot be done quickly, nor can it be completed without leaving the office.

- The financial analysis for calculating the projected profit and loss under different scenarios and the pay back period. Although this task was not carried out explicitly, the profitability of the products was considered and concerns were raised as to the substantial pay back period required to recoup the costs of product launch activities. This task was planned for the Feasibility Phase as it was important to gain an accurate assessment of the financial return these products would generate. However in was evident that this information would not be available until other related topics was investigated.

1.3.3 Concept Gate

The concept gate was performed at a meeting of the project team on the 07/10/04. It was facilitated by the researcher who presented the summary of the market audit and recommended that Flexi-milk and Balancing Milk continue to the next phase and Relaxing Milk be 'killed' i.e. halted as it did not meet the development requirements.

It was acknowledged in the meeting that some aspects of the Quest process such as the financial and technical review were yet to be completed. However,
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despite not having the full set of information required by the Quest process at the stage gate, the team gave the authority for the researcher to continue on to the Feasibility Phase on the basis of the market audit findings presented in the meeting. (Appendix 5 - LMC 2 Project Meeting).

1.3.4 Feasibility Phase

The goal of this phase was to build the business case for the products. It required marketing, financial and technical analysis to form a comprehensive profile of the products potential. This phase took 12 weeks to complete and was in line with the maximum duration guidelines for this stage of the Quest process.

The Feasibility Phase analysis was broken down into the following tasks:

<table>
<thead>
<tr>
<th>Quest Technical Tasks</th>
<th>Tasks Carried Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical and Product Performance</td>
<td>Complete</td>
</tr>
<tr>
<td>Technical Risks</td>
<td>Complete</td>
</tr>
<tr>
<td>Feasibility Study</td>
<td>Majority of the tasks were completed</td>
</tr>
</tbody>
</table>

All of the elements of the Quest Feasibility Phase were completed with the exception of the turn around time for manufacturing and lead time for the equipment to be commissioned. These tasks were omitted as this level of detail was not needed at this stage of the project (i.e. the team were familiar with the equipment needed and knew that the equipment cost and turn around time would not impact on the decision made at the feasibility gate).

In addition to the Quest tasks, prototyping and an investigation into the health claims were also completed during this phase. These tasks were viewed as essential for the project team to make a valued decision in the feasibility gate as
the taste of the product and the ability to advertise the health benefits to the consumer were essential to delivering a product that enticed consumers.

1.4 Financial Aspects

A condensed version of the financial analysis was carried out as the company did not require the detailed analysis recommended by the Quest process. It was considered by the project team that by carrying out the payback analysis it would adequately indicate the potential cash flow and amount of time it would take to recover the capital invested.

<table>
<thead>
<tr>
<th>Quest Financial Tasks</th>
<th>Tasks Carried Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected Profit and Loss</td>
<td>Indicated in the payback analysis</td>
</tr>
<tr>
<td>Detailed Costing</td>
<td>Completed in the payback analysis</td>
</tr>
<tr>
<td>Budget for development</td>
<td>Costs covered by the project budget</td>
</tr>
<tr>
<td>Check VAT classification and import duties</td>
<td>Complete</td>
</tr>
<tr>
<td>Capital Expenditure Proposal</td>
<td>The payback analysis formed the basis for discussions on potential expenditure.</td>
</tr>
<tr>
<td>Capital Investment Appraisal / Payback Period</td>
<td>Completed</td>
</tr>
</tbody>
</table>

Two scenarios were investigated as the retail price of the product was not yet known, hence the payback period were estimated as follows:

- Flexi milk (priced at 30% above standard milk prices) = 3 years and 42 day
- Flexi milk (priced at 80% above standard milk prices) = 193 days
- Balancing milk (priced at 30% above the standard milk price) = 1 year and 163 days

- Balancing milk (priced at 80% above the standard milk price) = 107 days

The company was prepared to proceed with a project that has not more than a year and a half pay back period; hence this analysis showed that further research was needed to determine the price that consumers were prepared to pay for these products (Appendix 7).

### 1.5 Marketing Aspects

It was intended that the questions raised in the Marketing Audit in the previous phase would be further investigated in this phase. However a change in priorities within the company meant that the NPD project was placed on hold and the researcher was unable to complete this project.

<table>
<thead>
<tr>
<th>Quest Marketing Tasks</th>
<th>Tasks Carried Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed Product Definition</td>
<td>Already carried out in the Concept Phase.</td>
</tr>
<tr>
<td>Competitor Analysis</td>
<td>Carried out in part in the Concept Phase. Questions still to answer were to be investigated further.</td>
</tr>
</tbody>
</table>
### Market Analysis

Carried out in the Concept Phase. Questions still to answer were to be investigated further.

### Detailed Market Research

Not considered important at this stage of the development by the project team as significant market research had been carried out by the consultants who recommended these product concepts. It was intended that this would be carried out at a later stage in the project.

**Brand Development:** The Quest process did not require brand development to be completed as part of this process. However, it was an essential part of this project as the brand needed to be created from which individual healthy milk products could be associated. In preparation for this, a tender document was circulated to a selection of design agencies with the intention of working with them to create this brand identity.

#### 1.5.1 Change in Focus in the NPD Project

The project was halted during the Feasibility Phase due to a change in priorities within the company. This change was minuted in a project meeting on the 07/02/05 as follows:

'The General Manager informed the meeting members that a Quality Improvement Project was about to begin at (the Company). Due to this project, the product development work must be halted as Claire (the researcher) was
required to take part in this project. It was acknowledged by all, that the KTP project timeline will change as a result of Claire’s involvement in the Quality Improvement Project.’ (See Appendix 9 - Meeting minutes for LMC 3)

A summary of the status of the NPD project was recorded in a meeting shortly following the change in focus. The decisions made in relation to the NPD concepts were:

Flexi-Milk – On hold – unlikely to progress
Balancing Milk – On hold - likely to progress

(Appendix 8)

Since the NPD project was put on temporary hold, the project has not been revisited, and is unlikely to be in the near future.

2 DISCUSSION

2.1 REVIEW OF ACTION TAKEN

The structure of the team was different to that prescribed by Quest. This was for logistical reasons in that there were not enough people involved in the project to maintain the recommended structure – i.e. a separate New Product Steering Group and a separate project team, and process owner. Instead, the project members carried out all tasks. This structure worked well in the SME environment where individuals are expected to carry out a broad range of responsibilities.
2.1.1 Idea Generation and Screening

The process that the team took was not dissimilar to that recommended in the literature. Fuller (1994) outlined that three sources of ideas can be considered: internal sources, external sources and market place analysis. During the idea generation meeting all three elements were covered. External – i.e. input from the university, that have access to information on changing consumer trends, internal via the company representative, and market place analysis – several of the ideas tabled in the meeting were those proposed by a market research company which had been commissioned by the company to investigate product opportunities.

2.1.2 Concept Phase

At the beginning of the project, all team members agreed to follow the Quest process. However it soon became apparent that the marketing expert in the team wanted to follow a different process to evaluate the concepts. This change was discussed and agreed by the project team resulting in some of the elements of the Quest Concept Phase being omitted. This change did not concern any member of the project team as they considered the Quest process to be only a guide for action which should be superseded when their knowledge was greater than that which the process offered.

The Concept Phase (i.e. the Market Audit) took eleven weeks to complete. This was significantly longer than the Quest guideline of one month. This phase took longer than recommended because it took a great deal of time to gain the market information requiring. Hence it appeared the one month guideline was not a realistic target for this phase.
2.1.3 Concept Gate

As mentioned in the section above, the concept gate was only partially completed. This was due to the fact that not all the information was available at the time of the meeting. Despite this, authority was given to continue with the project due to two reasons; firstly the confidence of the team in the concepts, and secondly the logistical difficulty of reconvening another meeting, which meant that the project could have been delayed as the information was likely to be ready to review before the project members were able to reconvene.

This approach is in stark contrast to the way the Concept Gate has been designed to be completed. Cooper (1994) highlights the need to complete stage gates as they have the strongest bearing on the project outcomes. Ironically, Cooper (1994) also found that these were often the weakest parts of the process.

Through this experience it was learned that competing priorities and pressure to complete stages can cause the stage gate to slip from top priority. However, it is apparent from research carried out by Cooper (1994) that this is exactly the trap which must be avoided if product development is to be successful.

2.1.4 Feasibility Phase

The majority of the Feasibility Phase was completed before the company put the project on hold. During this phase the project team elected to defer some tasks until the next phase and bring other tasks forward into this phase to find information that was essential to complete the Feasibility Stage Gate. The task brought forward was the investigation into health claims as it was crucial that the company could advertise the health benefits to consumers.
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The project team clearly used the Quest process as a conceptual guide and added and omitted tasks as deemed necessary. This approach reflects an ethos endorsed by Cooper (1994).

Cooper (1994) advocates that the NPD stages can be streamlined to fast track low risk projects or extended for high risk projects. This implies an intuitive approach to the NPD model, where the use of the model is specific to the nature of individual NPD projects.

Johnson and Scholes (1993) suggest that the use of models should be limited to well structured problems, as there is a danger that an NPD model can cause the over-simplification of a process which is very complex.

It was evident that despite the adherence to many best practice elements such as project planning, cross functional team involvement, and the use of technical, marketing, financial, and logistical experts in this project it was not completed. Consequently, it can be concluded that this project was not a 'success' in the terms defined in Objective Two.

However, the decision to halt this project was not due to a failure to follow best practice NPD guidelines; it was due to the company representative making a commercial decision to re-allocate the resources from this project to a quality improvement project that would provide a more immediate return on investment.

NPD projects are often threatened when managers are pressured for quick results. A study carried out by Matheson and Matheson (1998) identified one of the 14 barriers to implementing innovation best practice was a short-term focus. However, it cannot be said that the company made the wrong choice
when it was decided to put the project on hold as it was the responsibility of the company representative to make the decision in the best of the company.

2.2 Meta Cycle of Learning

The meta cycle of learning has been applied to the objective to gain an insight into the way tasks were approached.

2.2.1 Process: Did the Project Process Meet Best Practice Principles?

| The best practice principles that Cooper (1994) endorsed have been summarised by Price (2003): | Did the process meet best practice principles? |
| Killing poor quality projects early: Reduction in the time spent on poor quality projects: Stage 1 and 2 halt projects that are not going to succeed before resources are spent on them. | Yes – The project was halted because it was considered that the resources required by the project were considered to be of greater benefit if used in other company projects, i.e. a better quality project was identified – see Appendix 8 LMC 3 Meeting minutes - 07/02/05. |
| Use of Cross Functional Teams: Cross functional teams improve the quality of work and decisions made. This principle replaces the traditional functional team approach. | Yes – cross functional team was used to gain the information required – as illustrated in Objective 1. |
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| Tasks within stages being carried out in parallel: Reduced time taken for new products to reach the market: Tasks within a stage can be carried out in parallel (assuming adequate resources) hence reducing the time taken to complete the stage. | No – however this was not critical. Only one researcher was available to be committed to this project hence tasks could not be carried out in parallel. This however was not a critical factor in the project. |
| Customer focus: A strong market orientation is built into the whole process, increasing the possibility that the product will meet the customers’ requirements. | Yes – These product concepts came from market research carried out by consultants. Customer feedback was planned for the Feasibility Phase. |
| Clarity of tasks: Detailed product definitions are developed early in the process to provide clarity to the outcomes required by the completion of tasks. | Yes – Product definitions were set out at the beginning of the process. (see the Concept Stage Evaluation in Appendix 3 for product brief) |
2.2.2 Did the Management of the NPD Process Used Conform to Best Practice NPD Management?

During this study many of the best practice principles endorsed by Cooper (1994) were followed. However as outlined below there were several opportunities for improvements identified as shown below:

<table>
<thead>
<tr>
<th>Principle</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Principle: Formal Process</td>
<td>Griffin (1997) has investigated NPD practices in the United States. The results showed that the best performing companies (22% of the sample group) had a formal process that began with a clear strategy, with formal procedures that have been used for a long time. Griffin (1997) also reported that better performing US firms have rejected functional, sequential processes in favour of a multi functional stage gate approach.</td>
</tr>
<tr>
<td>Evaluation of actions taken during the project:</td>
<td>Yes the formal Quest stage gate process was used.</td>
</tr>
<tr>
<td>2nd Principle Effective completion of the first few stages:</td>
<td>Cooper (1994) found that the effective completion of the first few stages of the NPD process were pivotal to the success of new products. This conclusion was drawn after reviewing the success of new products launched by 306 manufacturing firms in Canada. The reason for this was thought to be the increased clarity given to early decisions, such as early and specific product definition leading to a measurable success in the study carried out by Cooper (1994).</td>
</tr>
<tr>
<td>Evaluation of actions taken during the project:</td>
<td>Not measurable as the project was put on hold.</td>
</tr>
<tr>
<td>3rd Principle: Management of the Stage Gates:</td>
<td>The managerial focus on...</td>
</tr>
</tbody>
</table>
critical evaluation at the decision points was also found to be an important factor in the study by Cooper (1994). From this analysis of 302 firms that undertook product launches, Cooper concluded that the decision ‘gates’ can be the weakest parts in the entire process, yet ironically these steps are designed to have a strong bearing on the projects’ outcome.

**Evaluation of actions taken during the project:** Not completed to best practice principles. The company did not complete the Concept Gate step in line with the advice of Cooper (1994).

**4th Principle** Pre-launch Business Analysis:

It was also found in two separate studies that the pre-launch business analysis decision point was frequently omitted (47% in 203 firms in the manufacturing industry and 65% in the chemical industry). However, it was also noted that these steps were carried out more frequently in companies that succeeded in product development (Cooper, 1994).

**Evaluation of actions taken during the project:** Not measurable as the project was halted early. During the feasibility phase a mini business analysis was carried out and it was intended that a more full investigation be carried out later in the project.

**5th Principle:** NPD Management Tools:

Short Term and Long Term Measures

**Evaluation of actions taken during the project:** Not appropriate – these measures can only be applied to a company that performs NPD projects on a regular basis. Hence these are not appropriate to this research.

**6th Principle:** Portfolio Management: Cooper et al. (1997 and 1998) identified 3 strategic goals to be considered in evaluating the magnitude of the benefit a
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new product may have on the existing product portfolio and the impact it has on reaching the company’s strategy. These are:

Maximise the values of the portfolio

Covet the Pearls – these are the ‘cash cows’ of the future.

Cull the Elephants (i.e. the products that have little customer appeal and are not selling well).

Do not generate too many bread and butter projects (i.e. incremental development such as line extensions).

Match the portfolio of products with the company’s strategy.

Balance the Portfolio

**Not appropriate:** Performance measures and portfolio management techniques have been recommended by researchers in the context of the corporate environment. Where multiple projects are undertaken via multiple project teams.

Lessons can be learnt from this as a SME has fewer resources to carry out NPD projects. Hence the correct selection that will move the company towards its strategic goals is much more critical.

**2.2.3 Did the Process Adequately Identify the Type Of Products That Would Suit The Company’s Resources, Skills, And Risk Profile?**

The fit of the NPD project to the company’s strengths and weaknesses must be questioned. The products developed had a high risk, high return profile. The high risk was due to the need to educate customers regarding the benefits of the ingredients of the ‘functional food’. The second element of risk existed due to the very competitive environment within which the product was to be launched. If the product was a success, the project team expected a corporate
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competitor to copy the concept and launch a similar product. Research by Mosey (2005) highlights the risk associated to these types of product launches; it was found that products that are new to the world and are launched in a new market for the company are the highest risk ventures to undertake.

The functional food market is very different to the market in which the company currently operates i.e. a commodity market that requires little marketing expertise, and customers being second tier supermarkets, discount stores, corner shops and the food service industry.

This vast difference in the skills and resources required to launch these products compared to the current portfolio of products became evident as the project progressed. This was acknowledged informally by several of the team members and was a contributing factor to the decision to place the NPD project on hold indefinitely.

In hindsight the following question needs to be asked: if the product characteristics were evaluated and compared to the company's capabilities as part of the Idea Screening process: would these products have been selected for development? It is the opinion of the researcher that the answer to this question would have been no.

This opinion was confirmed by the company's actions after the project was put on hold when the company made a cost reduction project the top priority in its place. This demonstrated the change in strategy to a more traditional method of improving profits (Price, J., 2003).
2.2.4 What NPD Strategy Options do SMEs have?

One of the barriers to implementing innovation best practice identified by Mathesons and Matheson (1998) was a lack of strategy, or a strategy that has conflicting priorities, a vague vision, or an over-specific long term plan. This company had a strategy that was vague e.g. one of the objectives was to ‘increase new product development activities’ (Company 2004 Business Plan and Budget).

However, the project objective was very specific: launch a premium milk based product into a multiple retailer. This was perhaps too specific as it did not allow the team to take account of the wider organisational issues of risk associated with such a venture and the ability of the company to deliver such a product.

There is an alternative NPD strategy that the company could have adopted that may have suited its characteristics better than the high risk, high return strategy that was attempted. Literature suggests that a lower risk approach has been of benefit to SMEs as they can gain skills and confidence by carrying out a series of NPD projects with increasing complexity.

Both Jones (1998) and Mosey (2005) offer some guidance for creating strategic plans, which enable SMEs to begin the process to establish innovation within the firms’ normal operations. Both authors recommend a low risk beginning that maximises the leanings from the initial project before a more ambitious project is launched.

Mosey (2005) stated that SMEs can gain a powerful competitive advantage over their larger competitors by developing new-to-market products utilising novel, and often simple technologies through the process of developing NPD
capability and applying these proven strategies. Hence there is much to be gained for SMEs that become proficient at NPD.

2.2.5 Context of the Study

The context of this study was influenced by the external market pressures and internal resource constraints. The company faced strong competition, and regularly had to defend their customer base against competitors and their aggressive sales tactics. In addition to these tough market conditions, the cost of raw materials was increasing which further increased the pressure on the profit margin (Chair's notes in Appendix 5 LMC 2 Project Meeting - 5/10/04).

Initially, these pressures were a motivating factor to begin this research project as it was a way of bringing added value products to the company's portfolio which were not as price sensitive as the current products. However, nine months after the project had began; the same pressures caused the company to place this project on hold in order to focus on shorter term projects that would see a more immediate improvement on the profit margin.

2.3 Assumptions Tested in Relation to the Context of this Research

Initially, it was assumed that the Quest process would guide the company towards a successful new product launch. This assumption was based on the literature which promotes stage gate processes like Quest as a key factor in the success of NPD (Cooper, 1994).

The above analysis has shown that the principles of the Quest process were followed in general. However, the prescriptive detailed instructions were not
adhered to. This can be attributed to the context in which the project was carried out - the company culture was intuitive and reactive compared to the Quest process which was very rigid and prescriptive.

The culture of the company was influenced by the environment of the fast moving consumer goods market. Typically, problem solving required urgent solutions and as such there was no time to stop and analyse a problem. This intuitive and flexible approach to problem solving was adopted during the NPD project. It resulted in the project team using the Quest process as they saw fit and discarding parts that were deemed unnecessary and to time consuming.

Appendix 3 - LMC 1 Project Meeting Minutes: 'It was noted by all parties that the project plan is very flexible to take account of the ever changing business environment and amendments are possible throughout the duration of the programme'.

Literature supports the flexible approach that the company took to the NPD process. Johnson and Scholes (1993) suggest that the use of models should be limited to well structured problems, as there is a danger that an NPD model can cause the over-simplification of a process which is very complex.

Cooper (1994) advocates that the NPD stages can be streamlined to fast track low risk projects or extended for high risk projects, where more time and attention is needed to reduce the risk of failure. This advice from Cooper (1994) implies an intuitive approach to the NPD model, where the use of the model is specific to the nature of individual NPD projects.
This advice was not in line with the Quest process as it was prescriptive and rigid with no mention of how to streamline the process when simple innovations were developed.

The second assumption made in relation to the context of this study was that the organisational structure specified by the Quest process could be rearranged to suit the resources that were available to the team. Quest specified that three groups of people must be involved in NPD. Namely: the steering group, the process owner and the project team. It was unrealistic to expect an SME to have this number of people with the knowledge of NPD and the time available to participate in the project. As a result, the research was carried out predominately by the researcher who then submitted the sections of work to the project team to review and agree the next step. There did not appear to be any detrimental affect on the project due to this structure or use of the researchers’ time.

A final assumption tested in relation to the context of the research, was the availability of time and resources to carry out the NPD process. One of the reasons the company chose to halt the project was that it felt that the time and resources could be better used in more short term projects. Hence it is clear that resource constraints were a major factor that contributed to the new products not being launched.

### 2.3.1 Analysis of the Project Premise

It is important to consider the premise of this objective as it relates to the previous objectives i.e. the impact of the business environment on the project,
and the comparison between the initial definition of success and associated assumptions, and what has been learned from the project.

In Objective 1 and 2 several assumptions were made that related to how this project would be carried out. These assumptions have since been tested and the results are listed below:

- The researcher assumed that the project plan would be followed explicitly.  
  **Result:** This was not the case; the project plan was changed to accommodate other projects at the company which took priority. This demonstrated that the NPD project was not always the top priority for the company. The deviation from the agreed plan was politically motivated. It appeared that the company wanted to change the agreed timeframe to suit the company’s financial, however the company representative did not make this clear from the outset. This is reflecting in an article written by Matheson and Matheson (1998) that list political secrecy as a means of acquiring power and as a barrier to implementing innovative best practice. (See Appendix 2 for the project plan – project not started until Point 9 (a new product with 0.9% fat) was launched and then the project was terminated when a quality project was initiated.)

- It was assumed, by the project team that the NPD strategy suggested by the market research company was suited to the company’s capabilities, the market conditions and risk profile (i.e. to develop functional food drinks).  
  **Result:** During the course of the project, it became apparent that this strategy was not suitable for the company, as it demanded a greater amount of financial resources and marketing expertise than that which the company was willing to invest in.
• It was assumed that between the university, the researcher and the company the skills were sufficient and available to carry out this project competently.

Result: It was found that this was indeed the case, as all elements of the project had more than adequate expertise to complete the tasks (see the review of the functional elements in this chapter – section 1.3.3.).

• It was assumed by the company management team that the market was stagnant and that there was little opportunity to develop existing products or business relationships. This assumption is in contrast to the opinion of Jones (1998) who believed that in the UK’s mature manufacturing sector it is the managers choices in SMEs that have a greater influence on the profits and growth than the market conditions.

Result: Since completing this project, the researcher has observed that this assumption is not correct. The company has recently launched a new product range – organic milk - to existing customers which has allowed them to charge premium prices and has proven to be successful with customers.

At the beginning of the project, the teams approach was in-line with an entrepreneurial ethos described by Jones (1998). However, the project ended with the team changing its strategy in two of the key areas that indicate a change in approach, as described below:

• Willingness to experiment: The team abandoned the ambition to create new products and adopted a conservative approach to create more profit by reducing cost and introducing other goods to existing customers.
- The team failed to solve a dilemma which the new products concepts presented; i.e. the management of the significant risk and the investment required to launch the product in order to achieve the potentially large profit. As a result it was decided that this project was too risky to continue with. It was apparent that there was political element to this decision it was identified by the team that more marketing skill was needed in the company for the project to succeed. However, the company representative was unwilling to address this skills shortage and consequently was one of the factors that lead to the decision that the project was too risky to continue with.
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SUMMARY AND CONCLUSION

1 SUMMARY

The aim of this research was to critically evaluate the product innovation process Quest in order to determine if it promotes successful NPD in a SME.

The objectives were to:

- Determine the business environment, capabilities, and approach taken towards product innovation. This information provided the context within which the process was used.
- Define what a successful NPD process was, as described by literature and by the company. This definition set the criteria by which the Quest process was judged.
- Assess the ability of the Quest process to promote successful product innovation by using it to develop new products.

1.1 OBJECTIVE 1 - DETERMINE THE BUSINESS ENVIRONMENT,
CAPABILITIES AND APPROACH ADOPTED BY THE PROJECT TEAM

The company was a mature manufacturing firm that held a stable market share in the convenience milk sector. The company had been producing the same products for the same market for many years and consequently had a strong culture and many accepted business processes and assumptions. This influenced how decisions were made during the project.
The project team was made up of a company representative, university members and the researcher. All of these brought different cultures, expectations, assumptions, and capabilities to the team. The company representative was experienced in operational matters such as distribution production and sales, and the university members and researcher provided capabilities and experience in the NPD process, project management and marketing.

At the outset of the project, the team adopted an entrepreneurial approach to NPD. This philosophy was recommended by Jones (1998) as the most appropriate approach to achieve successful NPD.

During the project, the teams resolve to maintain an entrepreneurial approach was tested together with many of the assumptions that team members held.

1.2 OBJECTIVE 2 - TO DEFINE WHAT A SUCCESSFUL NPD PROCESS IS AS DESCRIBED BY LITERATURE AND BY THE COMPANY

This investigation found that both the company and the literature do not differentiate the success of the NPD process from the success of the product launched. Literature suggests that the success of the whole project can be gauged through short and long term measurements. However, the company considered success of the project (and consequently the Quest process) to be defined by whether or not very specific objectives were met; i.e. achieving a suitable return on investment, revenue generation, and achieving their market share aspirations.
1.3 **Objective 3 - To Assess The Ability Of The Quest Process To Promote Successful Innovation By Using It To Develop New Products**

The Quest process was found to reflect best practice principles, and was a useful tool to guide the structure in the stages in the NPD project. The general principles of the Quest process were followed by the project team. However the team deviated from this process when it was decided that certain tasks needed to be completed ahead or behind the recommended schedule.

A significant point learned from this objective was the need to prevent competing priorities from taking the project away from best practice principles. Specifically: the stage gate reviews were not carried out as recommended by the Quest process due to time constraints and competing priorities distracted the teams focus from the NPD tasks.

1.4 **The Impact of Objective 1 and 2 on Objective 3**

The findings of Objective 3 must be considered in relation to the previous two objectives investigated. Objective 1 identified that the project team began with an entrepreneurial ethos. However, when the team found that the new products were high risk and required substantial resources to launch, their resolve to maintain this ethos waned and eventually the project was halted as the company reverted back to a low risk business strategy. It is important to note that this decision was made despite the research showing that these products may have been very profitable if launched successfully.
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Could this change in direction be avoided? It is the researchers' opinion that there was no way of preventing the extensive time spent on this project before it was halted, as the company was questioned in regards to their resolve to progress with the innovative project concepts at several stages during the project and were prepared to continue with it. It wasn't until the products were researched in detail during the feasibility stage that the company fully appreciated what it would take to launch these products and subsequently halted the project.

Objective 2 provided a definition of successful NPD. Compared to the definitions established, this NPD project was not successful as it did not lead to the launch of new products and the specific objectives set out by the company. Nor did it meet the more general objectives outlined in literature.

Despite the project not resulting in a product launch, the Quest process helped structure the project and provided a checklist of tasks to complete. In this way it increased the chance of success. However, the project was halted due to strategic decisions which were outside the control of the project team.

This project has provided learning opportunities that can be applied to SMEs in the mature manufacturing industry. It has highlighted the need to seriously evaluate the 'fit' of the NPD strategy to the company and to control the stage gate decisions.

Research papers that were reviewed presented different arguments as to the factors which should be emphasised and controls and systems that must be in place to achieve an innovative solution. Despite the apparent differences in opinions, researchers point to the same conclusion: the factors that constrain or
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enhance product innovation are the same factors that constrain or enhance any element of a business. These are the availability of resources, systematic control of the process, and the management of the people involved in the process.

For any NPD stage gate process to be used successfully, an intuitive approach must be taken as each project requires a different degree of analysis at each stage i.e. there is no way of defining a process that accounts for every project. Successful decision making is achieved through experience and knowledge of the marketing, finance, technical, production, distribution business functions. Consequently, an NPD project will be only as good as the understanding of these disciplines and the availability of resources to adequately investigate the aspects required.

2 CONCLUSION AND RECOMMENDATIONS

This research found that:

- The Quest process was used within a business context of a mature manufacturing SME with long established ways of operating and maintained a traditional production focus. However, the project team was willing to adopt an entrepreneurial ethos at the outset of the project that would be beneficial to the project. This approach has been recommended by Jones (1998) as being the most appropriate approach to NPD for mature SMEs. Unfortunately, the resolve of the company to maintain this approach waned during the course of the project due to the pressure from adverse market conditions. This resulted in the company reverting back to the more traditional production orientated approach and placing the project on hold.
• It was not possible to accurately determine if the Quest process promoted a successful product innovation because firstly the success of the NPD process could not be measured separately from the success of the whole project. Secondly, because the project was halted due to strategic reasons. However the researcher did experience advantages from having the Quest process to draw upon as it provided a structure and a checklist of tasks.

• It was found that the Quest process was in-line with best practice principles. However it was a very prescriptive model. Hence, the project team did not complete all the prescribed tasks in the order or to the level of detail outlined by Quest. For future projects this would need to be used intuitively as was the case in this research.

• In order for the Quest process to be used intuitively, the users must have a high degree of knowledge of the principles of NPD in order to decide which tasks can be simplified and what tasks need to be carried out in detail for any given project.

• The NPD strategy embarked upon during this project did not fit the company’s risk profile or resources available. This was a flaw in the project as it resulted in the company pulling out of the project once the risks involved and the resources required were understood. It is recommended that the strategy outlined by Jones (1998) and Mosey (2005) be followed in the future: a low risk beginning that maximises the leanings from initial projects before launching into more ambitious projects.
3 DIRECTION FOR FURTHER STUDY

In the mature UK food market, there is great competition between dairy companies to secure the lion’s share of the growing health, convenience and indulgence markets. The challenges faced by this company to create a new product which meets customer demand are similar to those documented in literature as challenges which SMEs face in general.

This new knowledge may be useful for SMEs that begin the NPD process and are in the mature manufacturing industry. Further research into NPD in SMEs that followed the entire Quest process would reveal more about the relevance of this process to SME’s. Subsequently, the Quest model could be adapted to become a robust tool for SMEs.
REFERENCES


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I. APPENDIX 1 - QUEST PROCESS
Appendix 1 Quest Process - Company Document Created October 1999

Summary of Quest Process

Idea Generation

Initial Screen
An initial assessment of the idea to check that it fits with our product and marketing strategy

Stage 1
Concept Phase
A fast check of the market, existing capabilities and financial viability. Tightening of consumer/product proposition.

Stage 2
Concept Screen
A review of the project against specific criteria for:
- strategic fit
- market attractiveness
- competitive position
- technical factors

Stage 3
Feasibility Phase
An extensive stage that requires market research, competitive analysis, technical and manufacturing assessments and financial justification.

Stage 4
Decision on Business Case
This requires a management team sign off and commitment to proceed to development with required resources allocated

Stage 5
Post Launch Team Review
A full review of the project from idea to launch by the project team

Full Production & Market Launch
Full implementation of plans for production, distribution, marketing, sales and human resources. Monitoring systems for tracking actual performance need to be in place.

Pre-launch Review
Final review before product is launched to market.

Testing & Validation
An extensive stage in preparation for market launch. Will include:
- Procurement & commissioning of plant
- Recruitment and training
- Advertising and promotion
- Test market launch

Investment Decision Screen
The major commercial decision gate with commitment needed to proceed with investment and marketing plans

Development
An extensive stage where most of the technical and marketing development takes place. Will include:
- Branding
- Packaging Design
- Pilot Product Runs
- Marketing Plan
- Extensive Market Research
Appendix 1 Quest Process - Company Document Created October 1999

The Golden Vale Quest Process (New Product Introduction)

Initial Screen

- Concept Screen (Gate 1)
- Decision on Business Case (Gate 2)
- Investment Decision Screen (Gate 3)
- Pre-launch Review (Gate 4)
- Final Project Team Review

New Products Steering Group

Process Owner

- Marketing/Sales
- New Product Development
- Finance
- Technical/Manufacturing

Project Team

Project Manager

- Concept Phase (Stage 1)
- Feasibility Phase (Stage 2)
- Development (Stage 3)
- Testing & Validation (Stage 4)
- Full Production & Market Launch (Stage 5)
Stage Gate Decisions

One of four Decisions can be made at the conclusion of a Stage Gate Review:

GO:
The project meets the Review Criteria and progresses to the next stage

KILL:
The project fails to meet the Review Criteria and does not proceed any further

HOLD:
The project is put on hold due to unavailability of resources

RECYCLE:
The project is referred back to the previous stage to complete a specific piece of work, required for the project to meet the Review Criteria
Appendix 1 Quest Process - Company Document Created October 1999

Ideation Stage:

NEW IDEA SOURCES

- Trade Shows
- Magazines
- Consumer Research
- Internet
- Store Visits
- Market Visits
- Brainstorming Session
- Employees
- Customers
- Suppliers
- Relationships/Partnerships
- Networking
- Patents
- Research & Development
- Universities
- Licensing Shows
- Institutions/Gov. Bodies
- [Trade Boards]

THE PROCESS

- Identify New Idea
- Complete New Idea Document
  - Name
  - Date
  - Source
  - Attend the Initial Screen Review
- Pass new Idea to Process Owner
- Allocate next sequential number to New Idea Document and Log in New Ideas Database
- Review Idea against Screen Criteria
- Make Decision on Project
- Give feedback on decision to Idea Source

PERFORMANCE MEASURE:
MAXIMUM DURATION OF STAGE FROM RECEIPT OF IDEA TO GATE 1 = 3 Weeks

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Appendix 1 Quest Process - Company Document Created October 1999

Initial Screen

- New Idea Document

Screening carried out by: Project Team

Decision to
GO/KILL/HOLD/RECYCLE

If go, then:
* Agree Key Functions/People required for next stage (marketing, technical/NPD)
* Proposed Date for Gate 2 Review (1 month)
Appendix 1 Quest Process - Company Document Created October 1999

Concept Phase (Stage 1): The Tasks

- Executive Director meets with Project Manager to agree Project Plan and Resourcing
- Project Manager agrees Plan with Team Member(s)
- Develop Project Plan

**Project Team**

- Project Development
- Finance
- Marketing

- Preliminary Market Assessment (see guidelines)
- Preliminary Technical Assessment (see guidelines)
- Preliminary Financial Assessment (see guidelines)

- Assessment reviewed by Project Team
- Decide to proceed to Gate 1
- Confirm Gate 1 Review Date

- Circulate Report to NPI Steering Group. (At least three days prior to meeting)

**PERFORMANCE MEASURE:**
MAXIMUM DURATION OF STAGE

- 1 Month

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Appendix 1 Quest Process - Company Document Created October 1999

Concept Phase: Task Guidelines - Marketing/Technical/Finance (Desk Research Only)

Product Definition
- Product Description
- Product Size
- Retail Selling Price
- Unique Selling Point/Key Customer Benefit

Possible Product Acceptance
- Present concept to target audience
  (internal/external people, school key user groups)

Marketing Tasks
- Competitive Situation
  - Competition: Customers
  - Market Share (%)
  - Key Strengths/Weaknesses

Market Attractiveness
- Size
- Growth/Decline
- Segment
- Demographics
- Existence of Opportunity
- Potential Volumes

Technical & Product Performance
- Product Requirements
- Ingredients Requirements
- Technical Requirements

Technical Tasks
- Development/Manufacturing Assessment
  - What would be involved in making it?
  - Could we manufacture it?

Technical Risks
- Potential Production problems

Financial Tasks
- Capital Investment Appraisal
  - Payback

Projected P&L a/c
- Different Scenario

"This Stage should be desk research only"
Appendix 1 Quest Process - Company Document Created October 1999

Gate 1 - Concept Screen

*General Recommendation by Project Team

Preliminary Marketing Assessment Report

Preliminary Technical Assessment Report

Preliminary Financial Assessment Report

Proposed Project Plan

Proposed Project Team

Proposed Budget Requirements

Decision to

GO/KILL/HOLD/RECYCLE

If GO, then:

*Proposed Project Plan
*Proposed Project Team
*Agreement on Budget

If HOLD, then

*agree date to review

If RECYCLE, then:

*agree, specifically, what information is required
*agree date to review
Feasibility Phase (Stage 2) (Build the Business Case):

- Project Manager finalizes responsibilities of Project Team members with relevant Managers.
- Project Manager meets with team to update Team on project progress to date.
- Project Scope is agreed, main tasks are identified and roles and responsibilities are agreed.

Develop Project Plan

- Detailed Market Assessment (see guidelines)
- Detailed Technical/Manufacturing Assessment (see guidelines)

- Decide to proceed to Financial Assessment
- Review by Project Team

- Detailed Financial Assessment (see guidelines)
- Assessment reviewed by Project Team

- Decide to proceed to Gate 2
- Confirm Gate 2 Review Date

Circulate Report to NPI Steering Group. (At least five days prior to meeting)

PERFORMANCE MEASURE:
MAXIMUM DURATION OF STAGE
- 3 Months
Appendix 1 Quest Process - Company Document Created October 1999

Feasibility Phase: Task Guidelines - Marketing

Detailed Product Definition
- Product Description
- Product Size
- Retail Selling Price
- Unique Selling Point/Key Customer Benefit

Detailed Market Research
- Concept Testing
- User Needs & Wants Study
  (Focus Groups, Market Surveys, In House Discussions with Sales)

Marketing Tasks

Detailed Market Research
- Concept Testing
- User Needs & Wants Study
  (Focus Groups, Market Surveys, In House Discussions with Sales)

Marketing

Competitor Analysis
- Competitors - Customers
- How well are they performing
- Market Share (%)
- Key Strengths/Weaknesses
- Cost and Profit Structure
- Products that will be displaced
  (Literature & Advertising, Trade Publications, Acquire products, Industry Specialties)

Market Analysis
- Size
- Growth/Decline
- Distribution Channels
- Trends
- Segment (characteristics)
- Buyer Behaviour (who, what, when, where, why & how)
- Trade support (particularly for new category)
- Shopping Behaviour
- Potential Volumes
- Barriers to Entry ('How defensible is the proposition?')
Appendix 1 Quest Process - Company Document Created October 1999

Feasibility Phase: Task Guidelines

**Technical & Product Performance**
- Determine Product Requirements
- Determine Ingredients Requirements
- Determine Technical Requirements
- Determine Estimated Shelf Life
- Determine the packaging requirements

**Detailed Technical/Manufacturing Assessment**

**Technical Risks**
- Identify potential Production problems
- Determine likely manufacturing location and why?
- Determine suitability for patent
- List the key steps in the development stage
- Determine milestones

**Detailed Projected P&L a/c**
- Different Scenarios

**Detailed Financial Assessment**

**Budget for Development Phase**
- Trials
- Research
- Groups
- Recruitment
- Equipment
- Materials
- Prototypes

**Capital Investment Appraisal**
- Payback
- ROI/ROCE

**Check Vat Classification and Import Duties**

**Feasibility Study**
- Determine Development Time and Cost
- Specify Manufacturing Process from Material receipt through to Finished Product
- Estimate Lead Time of Equipment
- Estimate Manufacturing turnaround time
- Identification of key milestones and how they will be tackled
- Identify the potential barriers to competitors fulfilling customer needs

**Cash Flow Forecast**
- Different Scenarios

**Capital Expenditure Proposal**
- (complete forms)
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Gate 2 - Decision on Business Cal.

- Detailed Marketing Assessment Report
- Detailed Technical Assessment Report
- Detailed Financial Assessment Report
- Proposed Project Plan for next
- Resources Requirements
- Overall Team Recommendation

Project Team + NPI Steering Group

Presentation format for Gate Review:
1. INTRODUCTION
   - format
   - project concept
   - background
   - project status
   - project category
2. STRATEGIC FIT
3. MARKET ATTRACTIVENESS
4. COMPETITIVE ADVANTAGE
5. RISK ASSESSMENT
6. SUMMARY OF 2, 3, 4 & 5
7. OVERALL RECOMMENDATION

Decision to
GO/KILL/HOLD/RECYCLE
If GO, then:
- Agree Project Plan
- Agree Project Team
- Agreement on financial considerations/requirements
If HOLD, then
- agree date to review
If RECYCLE, then:
- agree, specifically, what information is required
- agree date to review
Development: Pre-Gate 3

NOTE: The financial outputs from Gate 2 need to be closely tracked during the development stage.

The project Manager, in conjunction with the project team, should agree the sequencing of tasks.

Can we provide security to match the level of risk?

Technical / Manufacturing / Logistics / Engineering / Marketing / Sales

Finance Product Development
Appendix 1 Quest Process - Company Document Created October 1999

Development Stage: Task Guidelines - Technical/Manufacturing

**Produce Spec of Equipment**
- Size
- Ergonomics
- Set-Up time
- Efficiency
- Cost
- Flexibility
- Versatility
- Services
- Throughput
- Loadline
- Reliability
- Adaptability
- Vendor Analysis

**Determine impact on existing manufacturing systems**
- Space requirements (raw materials and finished goods and packaging)
- Quality requirements (fit, form, function)
- Process changes
- Change over times
- Equipment change over times
- Production planning system
- Impact on shared flexibility (equipment needs)
- HACCP

**Validate production process**
- Produce prototype product offering
- Check against production definites (apparatus, formulation etc.)
- Identify process difficulties
- Determine F of prototype required
- Schedule times
- Conduct Shell life trials (if appropriate)
- Identify special packaging functional requirements

**Produce detailed product specification**
- Outline functional requirements
- Outline performance requirements
- Identify packaging requirements
- Identify palletising requirements
- Generous ingredient list
- Outline/describe information on packaging
- Outline list of Health Claims
- Specify shell life requirements
- Raw materials sourcing
- Specify storage requirements
- Detail limitations to use

**Determine Health & Safety Issues**
- Product Risk Analysis conducted by Health and Safety Office

**Produce Capital Expenditure Documentation**
- Complete templates/forms

**Define Logistics System**
- Determine storage requirements for finished goods - quantity and location
- Assess fit with existing product lines
- Assess fit with existing sales/services/market structure
- Specify information requirements/systems
- Determine warehouse shell life requirements
- Determine optimum supply chain (including delivery systems)
- Define Ordering System
- Define Invoicing system

**Determine HR Requirements**
- Skills required
- Facilities
- Recruitment plan
- Fit with existing production cycles/practices (shift times)
- Training requirements
- Costs

**Manufacturing outsourcing**
- Assess financial viability of potential suppliers
- Identify any potential issues of product
- Assess fit with specific strengths
- Assess track record
- Determine closeness to market
- Outline distribution channels
- Outline potential capital commitments
- Assess supplier quality systems
- Identify impact duties
- Define legal agreements
- Identify any influential relations issues
- Assess supplier's reliability records

**Determine manufacturing requirements**
- Determine availability of inputs (raw materials, labour & skills)
- Outline space, equipment requirements
- Determine prevents/limits expansion limitation
- Obtain building permits, land zoning, space
- Determine market support availability
- Outline labour costs and availability
- Outline estimated time to start up
- Assess fit with existing manufacturing line
- Assess fit with existing organisation culture
- Determine training requirements
- Specify shell life issues - close tolerance to market
- Determine available auxiliary services

Appendix 1- Page 15 of 26
Development Stage: Task Guidelines - Marketing

"This is not a logical step by step process; it will often require going back and completing the same task a second or third time, depending on the outputs"

- Develop Concept in Branding naming and identity
  - name search
  - generate 3 possible identities (different cultures, age, look style etc.)
  - trade marking
  - generate possible sources
  - research
  - decide on best option.

- Carry out Qualitative Research
  - answer questions in positioning, branding, communication etc.
  - agree brief
  - determine sample size, segment, methodology
  - focus groups
  - extend interviews with small groups
  - buyer behaviour studies (e.g., observation)

- Review & Validate Marketing Outputs from previous stages
  - identity communicated, questions from principle, and decide and implement
  - Market research
  - How was expanded the right prospects, audience, market segment?
  - Are the mistakes being carried out correctly?
  - source, method, sample size, reliability, implications of results.

- Refine Concepts

- Quantitative Research
  - How many will buy and how often?
  - agree brief
  - determine sample size, segment, methodology
  - in-house placement
  - Preference testing

- Produce Product Marketing Plan
  - objective and strategy
  - promotion and advertising
  - packaging
  - media and distribution
  - pricing

- Marketing Tasks

- Sales force feedback
  - outline concepts
  - propose merchandising
  - market suggestion ideas

- Determine Funding Availability
  - who are the potential sources

- Design Packaging and agree Packaging Source
  - labels
  - net code
  - legal requirements
  - end
  - date code compatibility with production
  - nutritional claims

- Determine Resource Requirements:
  - need for brand manager
  - internal/external

- Produce Communication Plan
  - select an agency (involves as early as possible)
  - define product positioning strategy
  - who aimed at, key benefit
  - develop media strategy
  - TV, Radio, PR, Outdoor advertising (generate concepts, agree budgets and timelines)
  - prepare back-up materials (P.O.S.)
Appendix 1 Quest Process - Company Document Created October 1999

Research

Quantitative Research:
* typically focuses on the links among a number of clearly defined and measured attributes involving many cases

Qualitative Research:
* typically focuses on the links among many conceptualized attributes involving few cases

The use of either method is largely determined by the research question:
Research category: Question:
Exploratory What
Descriptive When, Where and How
Explanatory/Causal How and Why

Techniques generally used in business research:
- Focus Groups Qualitative
- Forecasting (modeling) Quantitative
- In depth survey Qualitative
- Large scale survey Quantitative
- Scenario research Qualitative
**Appendix 1 Quest Process - Company Document Created October 1999**

**Test & Validation**

- **Sales force briefing**
  - 2 weeks before product is ready to launch
    - set out expectations
    - define the role of the salesforce
    - communicate marketing plan
    - seek suggestions/feedback/queries
    - which should be raised previously

- **Trade and Product Launch**
  - 4-6 weeks before launch (once listings are achieved)
    - venue
    - invitations
    - budget
    - must be agreed with internal pressured (availability critical)

- **Marketing Tasks**
  - Finalise advertising, promotional and PR materials
    - 
        - clear critical path for TV advertising
        - relevant approvals
        - legal rights
        - check budgetary constraints

- **Check Timelines committed to Trade**
  - Market Tracking
    - decide on need
    - agree market research company
    - define tracking requirements

- **Determine trade reaction and quantity attainable listings**
  - arrange meetings with key buyers
  - produce trade marketing plan
  - identify key customer benefits
  - what does product add to category
  - resolve prices/margins issues
  - determine achievable level of trade listings (if appropriate)
Appendix 1 Quest Process - Company Document Created October 1999

Gate 3 - Investment Decision

- Sales Reports with proposed listings & volumes
- Marketing Information (research results)
- Technical Reports
- Manufacturing Reports
- Logistics Reports
- Engineering Reports
- Financial Reports
- Prototype Product
- Test and Validation Results
- Proposed Project Plan for Launch
- Human Resource Requirement Plan
- Capital Equipment Forms
- Equipment Specified and Costs
- Manufacturing flow specified
- Mock-up for packaging
- Critical Path for rest of project

Decision to
GO/KILL/HOLD/RECYCLE
If GO, then:
* Agree Project Plan
* Agree Project Team
* Agreement on financial considerations/requirements
If HOLD, then
* agree date to review

If RECYCLE, then:
* agree, specifically, what information is required
* agree date to review
Test & Validation

**HR Tasks**
- Recruitment of staff
  - Identify requirement
  - Prepare job description(s)
  - Agree with relevant manager(s)
  - Deliver training
  - Evaluate training effectiveness
  - Sign off training records

**Finance Tasks**
- Validate Financial Analysis
  - Use actual production figures

**Technical/Manufacturing Tasks**
- Supplier Audits
  - Only required for raw materials

**Main Plant Scale-Up**
- Conform with existing site
- Check design defects
- 3 successful consecutive trials
- Appropriate run length

**Product approved by Project Team**
- Finalized packaging (before replicating existing packaging)
- Check match of production against artwork
- Full check of product against specifications

**Commission and validate equipment**
- Component testing
- Process testing procedures
- Testing procedures

**Plant and Equipment - Purchase and Installation (Project Engineering)**
- Set up capital expenditure cost control system
- Carry out engineering design (drawings and specifications)
- Vendor process in accordance with procedures
- Update cost control system regularly
- Update project schedule

**Procurement of Packaging**
- Place delivery arrangements (if appropriate)
- Order all packaging components
- Obtain specifications for every component of packaging quality standards
- Establish incoming quality control checks with target and acceptable limits

**Procurement of Raw Materials**
- Place delivery arrangements (if appropriate)
- Order all raw materials from approved sources
- Obtain specifications for every component of raw material quality standards
- Establish incoming quality control checks with target and acceptable limits

**Produce Detailed Project Plan**
- Identify critical path

**Training of production staff**
- Identify training needs
- Prepare training plan
- Agree with relevant manager(s)
- Deliver training
- Evaluate training effectiveness
- Sign off training records

**Validate Financial Analysis**
- Use actual production figures

**Design appropriate product performance metrics**
Appendix 1 Quest Process - Company Document Created October 1999

Test & Validation

Sales force briefing
2 weeks before product is ready to launch
* set real expectations
* define the role of the salesforce
* commentary marketing plan
* vet on suggestions/opinions/quotes which should be vetted previously

Check Timelines committed to Trade

Finalise advertising, promotional and PR materials
* clear critical path for TV advertising
* standards/dimensions
* request approvals
* patented rights
* check budgetary constraints

Trade and Product Launch
8-9 weeks before launch (once listings are confirmed)
* venue
* invitations
* budget
* must be agreed with internal personnel (availability critical)

Marketing Tasks

Determine trade reaction and quantify attainable listings
* arrange meetings with key buyers
* produce trade marketing plan
* identify key categories
* what does product add to category
* resolve price/margin issues
* determine achievable level of trade listings (appropriate)

Market Tracking
* decide on need
* agree market research company
* define tracking requirements
Appendix 1 Quest Process - Company Document Created October 1999

Gate 4 - Pre-launch Review

- Sales and Marketing Reports
- Technical Reports
- Manufacturing Reports
- Logistics Reports
- Engineering Reports
- Financial Reports
- Prototype Product
- Test and Validation Results
- Proposed Project Plan for next Launch
- Human Resource Requirement Plan
- Capital Equipment Forms
- Prototype product
- Pilot Kit/Equipment
- Equipment Specified and Costs
- Volumes
- Specified number of listings
- Manufacturing flow specified
- Mock-up for packaging
- Quantitative Research
- Critical Path for rest of project

Gate 4

Project Team + NPI Steering Group

Appendix 1 - Page 22 of 26
Appendix 1 Quest Process - Company Document Created October 1999

Full Production and Market Launch

- Receipt of Customer Orders
  - Project Team to hold weekly meeting
    - monitor launch progress
    - involve key players from other functions - sales, production, logistics

- Review Production Planning and Order Fulfillment processes
  - monthly/weekly/daily planning
  - batch/continuous production
  - order receipt
  - transportation issues

- Produce Product Performance Report (actual versus targets)
  - must be available by the end of the 4th week
  - Distribution Coverage (%)
  - manufacturing efficiency (e.g. labour)
  - On time delivery (CTP, VOT)
  - A&F spend (status)
  - PCS

- Market Tracking Feedback
  - received after 6 to 11 weeks
  - advertising awareness and recall for target audience
  - trial, stock take, sales (AGB, Taylor Nelson)
  - review feedback and change plans, as required
  - retailer experience (Tesco Vs.Safeway)

- Review actual Vs forecasted demand
  - review programme of actual orders versus forecasted demand as early as possible
  - actual sales andFTP information

- Project Team Tasks

- Delivery Requirements
  - distributors must receive product at least one week in advance of supply to distribution
  - product must be available for all activities when required

- Sales & Marketing Tasks

- Determine Shop Shelf Life Requirements

PERFORMANCE MEASURE:
DURATION OF STAGE = 12 Weeks
Post launch Review

This review will be conducted by the Project Team (and facilitated by a Facilitator)
Duration 3 - hours

*Agenda:
• Total review of project from idea generation to product launch
• Review of project against project performance indicators
• Review of team performance
• Agree date(s) for formal hand over of project and team disbandment
• Agree team/project contact person after project hand-over

• Outputs of meeting/review should be copied to the Divisional Team and relevant Line Managers (so information can be used to for Team Member performance reviews
• Outputs of meeting should be used to evaluate the NPI process
Gate 1, 2, 3 For All Areas Of The Business

Strategic Fit:
- Is the product liquid?
- It must be 'Milk' based
- Will it support the core business?
- Can we differentiate?
- Can we be a significant supplier and add value?

Market Attractiveness:
- Does the product give the consumer unique benefits and superior value?
- Can we communicate that benefit efficiently?
- Is the market in Growth?
- Who are the competitors?
- Is potential GV profit greater than £500,000 (to be refined over time)?
- Is potential Net Profit > 10%

Competitive Position (need only one of the following): How well can this product maintain competitive advantage?
- Are we first in the market?
- Have we unique packaging?
- Have we a unique product
- Have we exclusive knowledge regarding product/consumer?
- Have we control over a distribution channel exclusive to us?
- Have we category strength?
- Can we develop a competitive service element?

Technical Factors: What is the probability of technical success?
- Do we have the technology know how?
- R&D work required?
- Manufacturability: capital cost/lead time?
A final decision should be made before the end of the evaluation. A project that is higher than the 12th line or lower than the 19th line should be rejected without further evaluation.

### DECISION

<table>
<thead>
<tr>
<th>TOTAL</th>
<th>Strategic Fit</th>
<th>Competitive Position</th>
<th>Market Attractiveness</th>
<th>Scoring Model</th>
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<tbody>
<tr>
<td>Very Low</td>
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</tr>
<tr>
<td>VERY GOOD</td>
<td>VERY GOOD</td>
<td>VERY GOOD</td>
<td>VERY GOOD</td>
<td>VERY GOOD</td>
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</table>

**Stage Gate Decision Process**

1. If Total > 12 then project should be kept at this stage.
2. If Total < 12 then project should proceed to the next stage.
3. If Total = 10 then the project should proceed to the next stage.
II. APPENDIX 2 - PROJECT TIME LINE
### Appendix 2 Project Time Line

#### Key:
- **Black Boxes** - Quest Phases
- **Gray Boxes** - sub-sections of work required to complete

#### Innovation Management Research Time Line

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Deliverables</th>
<th>Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Idea Generation:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brainstorming of product concepts to progress</td>
<td>4 product concepts to take through the first phase of the product screening</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>Stage 1) Concept Phase</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market Audit - External &amp; Internal Factors, Economic, Social, Technical, Legal and Environmental issues, competitors and potential reaction from competitors</td>
<td>Market Audit</td>
<td>3</td>
</tr>
<tr>
<td>Register - Trade Names: Point 9 and The Welsh Dairy</td>
<td></td>
<td>0.2</td>
</tr>
<tr>
<td>Logistic Tasks: Book time for the Redding UF plant, order bottles, book graphics to create the labels</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Gate 1) Concept Screen</td>
<td>Review of the project against specific criteria for A) strategic fit, B) market attractiveness, C) competitive position, technical factors.</td>
<td></td>
</tr>
</tbody>
</table>
### Appendix 2 Project Time Line

#### Key:
- **Black Boxes** - Quest Phases
- **Gray Boxes** - sub-sections of work required to complete

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Deliverables</th>
<th>Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 2) Feasibility Phase</td>
<td>Product Concepts</td>
<td></td>
</tr>
<tr>
<td>Draw up specification for potential additives (addressing issues such as GM)</td>
<td>Product Specifications</td>
<td>0.5</td>
</tr>
<tr>
<td>Source supplier(s) or potential additives &amp; book time with UF plant</td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td>Investigation into legality and labeling - concept level investigation into the type and strength of claim that can be made</td>
<td>Label wording</td>
<td>1</td>
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<tr>
<td>Healthy Milks - Create prototype product at UWIC</td>
<td>Prototypes</td>
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<tr>
<td>Healthy Milks - Functional testing and shelf life testing</td>
<td>Functional analysis &amp; estimated shelf life</td>
<td>6</td>
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<tr>
<td>Healthy Milks - Taste Test at UWIC</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Collation of results from the feasibility phase in preparation for Gate 2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Gate 2) Decision on the strength of the Business Case</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### KEY
- Flexi Milk
- Balancing Milk
- Low Carb Milk

**Notes:**
- ** sujetitive to change:
- **Key:**
  - Flexi Milk
  - Balancing Milk
  - Low Carb Milk
III. APPENDIX 3 – IDEA GENERATION

AND SCREENING
Appendix 3 Idea Generation & Screening

KTP

Idea Generation & Screening
Meeting 29/6/04
At UWIC Colchester Ave

Attendance: Company Representative, University Representatives, and Researcher.

Constraints to new products
- Suitability to everyday use
- Processing equipment possibilities: mixing equipment, long life heat treatment, or fermentation.
- Packaging equipment possibilities: bottles that fit the currently poly bottles and glass bottles processing lines:
- Markets: any market in the UK can be considered
- Limited marketing budget available
- Shelf life constrains – GV currently has the processing capabilities for pasteurising & homogenising milk. It may be possible to extension of shelf life by long life processing equipment or fermentation equipment
- GV is not limited to manufacturing milk based products.

Reasons for buying milk:
- Area where it is possible to increase the amount of milk consumed
  o Convenience drinks
- Areas where the volume of milk consumed is unlikely to increased
  o For use on cereals
  o To use in baking
  o Tea & coffee

Reasons to buy cream
- Indulgence uses – on desserts
- In dips or source

Ideas Discussed

Healthy products
Licence to make Benicol milk – i.e. skimmed milk, added viscosity, improved flavour and cholesterol reducing ingredients

Licence to make low carbohydrate milk and/or cream - Low Carb milk.

Licence to make Flora milk
Health giving milk – e.g.: milk that provides vitamins and minerals to provide 5 portions of fruit and vegetables for those that don’t have a healthy lifestyle. A) In standard milk, B) in flavoured milk for children
Appendix 3 Idea Generation & Screening

Hypoallergenic milk: much research needed before we could do this.

**Review of product concepts:**

**Screening of Current Product Concepts**

5 top ideas & opportunities for variations on Point 9.
Identify opportunities and challenges for each concept

**Flexi Milk**
- Possible addition of Omega 3 (not Cod Liver Oil as stated in the concept description) as it has a wider appeal.
- The stability of this product could be a problem over time as it could oxidise. Encapsulation of the active ingredients could minimise this.
- Easy open top would be a big benefit for this product and possibly a smaller size than the 2 Litre recommended in the report.
- The WDA is likely to support this product as it is Welsh and there is a definite health benefit available.

**Osteo Milk**
The name sounds medical or sounds like a milk for children of a similar name Ostemilk.

**Relaxing Milk**
Milk with an addition of melatonin or Kava and a honey or chocolate flavour. This milk would be for relaxing, relieving stress and encouraging sleeping and could have particular appealing to menopausal woman. This product can be heated up or consumed cold. Possible constraints: the side effect on children and adults, on those while driving, and the new supplement labelling regulations.

**Fit Milk 50+**
- Possible embarrassment at the idea of 50+
- Ginseng may have a negative connotation.
- This product will appeal to people other than just the 50+ age group. Hence the marketing of this product shouldn’t exclude young people
- A possible approach would be to investigate what supplement are most popular and put it in the milk.
- A possible constraint with the new supplement regulations.

**Vita Milk**
This product was described as being targeted at the lower end of the market; however it is thought by the group that the lower end of the market may not take a great care with their health.
- The iron would need to be encapsulated so that it and the calcium would be adsorbed.
- Energy giving properties and milk are not a good match in the mind of the consumer.
Appendix 3 Idea Generation & Screening

Balancing Milk / Prebiotic Milk
- Pro-biotic aiding good bacteria (e.g., dietary fibre and the addition of inulin) skimmed milk and dietary fibre for taste
- The cost could possibly be high for these ingredients
- In Ireland a similar product was launched – it would be beneficial to investigate how this product launch went and learn from the marketing strategy that was used.
- It may be beneficial to add to add a herb and antioxidants to this product for well being.
- This could be marketed as a convenience milk – one stop milk
- Potential constraint with the wording of the health claims.

Ideas other than healthy products:

Fruit smoothly
- Yoghurt and fruit
- Low carbohydrate option for the Atkins diet
- Targeted at the convenience market
- Ara has experience in manufacturing drinking yoghurt
- This product would need to be sold for immediate consumption i.e. café bars, or ready to eat markets Tescos – lunch bar etc, or have insulated containers

Markets
Milk for children’s breakfast market
Opportunity for breakfast market into schools due to a new initiate by the Welsh government. Gym market: milk based product with when proteins for muscle building.

Ethnic markets:
Identify who are the ethnic groups
- Ara has had experience with:
  o Salted drinking yoghurts
  o Minted Yoghurt – popular with the Iranian market, possible idea for a ready meal addition, or a dip
- Ara’s experience with fermented drinking fizzy yoghurt: it would need very smart marketing as it is a nice tasting product but the consumer will need a lot of convincing before they will try it. Louise: carbonated milk could be good for a hangover - cactus extract could also be added as it is also known to be good for hangovers
- There may be a synergy with the a link ethnic idea with existing product brands e.g. 1) make a product under the Pataks brand 2) Noon Foods link with current ready meal producers 3) or create a link with restaurants to create the right tastes 4) Use a group of Indian MBA students to do focus groups with – they are coming to UWIC in September.
- The Indian way of making tea is to boil the milk with the tea and cardamom & cinnamon and nuts, hence there could be a opportunity to make a cold tea that can be heated up. 
Appendix 3 Idea Generation & Screening

- A drink common in Nepal is hot milk, caramel and nuts, it is very sweet and is consumed by children.
- Ready meal packs of sauces for ethnic foods e.g. Italian, Indian, cream based sauces with high value in the chilled cabinet.

Breakfast market
Alcoholic
Fruit smoothie
Pinicolada
Milkshakes – like the Vodka Mudshake
Cocktail
Cream based cocktail
Sell through existing distribution of alcohols e.g. Brains and ride on the back of existing marketing.

Children's market
Flavoured milk – 5 + a day vitamins and minerals added to provide nutrients

Cream Markets
Sour cream by itself is as a flavoured dip
Cream Frais may be a better choice than sour cream as currently more people buy this than sour cream. It is worth considering that the party market is growing very slowly which could prove difficult; however there are also seasonal trends that can be capitalised on.

Summary
The new product concepts with the most potential were:
- Low Carbohydrate milk or cream
- 5+ a day milk with added vitamins with no flavour or colour taints
- Milks for the ethnic market
- Carbonated yoghurt
- Alcoholic drink

The way forward
Top ideas to be developed:
- Flexi-milk
- Relaxing milk
- Balancing milk
- Flavoured milk
IV. APPENDIX 4 - LMC 1 PROJECT MEETING
Appendix 4 - Project Meeting

KTP No. 000275

Between
The Company & UWIC

Minutes of Local Management Committee (LMC) meeting
Held on 22\textsuperscript{nd} June 2004

Present

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Howard Nicholls</td>
<td>Chairman</td>
<td>tti Consultant</td>
</tr>
<tr>
<td>David Stokes</td>
<td>Managing Director</td>
<td>The Company</td>
</tr>
<tr>
<td>Dr Louise Fielding</td>
<td>Lead Academic</td>
<td>UWIC</td>
</tr>
<tr>
<td>Dr Ara Kanekanian</td>
<td>Academic Supervisor</td>
<td>UWIC</td>
</tr>
<tr>
<td>David Lloyd</td>
<td>KTP Co-ordinator</td>
<td>UWIC</td>
</tr>
<tr>
<td>John Sweeting</td>
<td>KTP Associate</td>
<td></td>
</tr>
<tr>
<td>Claire Hungerford</td>
<td>Recorder</td>
<td>UWIC</td>
</tr>
<tr>
<td>Anne Barratt</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. **Select Chairman/ Secretary and Confirm Membership of LMC**

tti Consultant, Howard Nicholls welcomed everyone to the first meeting of KTP between The Company and the University of Wales Institute, Cardiff and explained that he would Chair the first meeting to advise and provide guidance.

Howard stated that the Local Management Committee (LMC) is at the top of the hierarchy of all meetings associated with the KTP and is convened quarterly.

It was noted that David Stokes would Chair all future meetings in addition to his role of industrial supervisor and programme facilitator. Dr Ara Kanekanian was confirmed as academic supervisor; Dr Louise Fielding as lead academic; John Sweeting as KTP co-ordinator and Howard Nicholls as tti Consultant.

2. **Review Purpose of LMC**

The roles and responsibilities of the LMC members in managing the project, agreeing financial expenditure and changes to the Programme were explained in detail.

Subsequent LMCs will follow a standard agenda format. The Associate will make a presentation at each LMC stating project objectives, activities to date, future activities and information on the personal development plan. Other brief reports are given by both industrial and academic supervisors, the Chairman, a University representative and the tti Consultant.

It was confirmed that all parties must be represented at the LMC meetings.

3. **Programme Objectives**

David Lloyd confirmed the major objectives of the programme. The meeting was asked to note that a “brain storming session” involving all interested parties would be taking place at UWIC on Tuesday 30\textsuperscript{th} June 2004. This may have an effect on the project plan.

It was noted by all parties that the project plan is very flexible to take account of the ever changing business environment and amendments are possible throughout the duration of the programme. This is subject to ratification at the LMC.
Appendix 4 - Project Meeting

The meeting was informed that a change to the project plan had taken place and the Gantt chart would be amended by the associate for presentation at the next LMC.

Action: CH

4. Recruitment, Contractual Issues & the Associate

It was noted that both the industrial and academic partners prior to commencement of the KTP had agreed all terms and conditions of the contract of employment.

The meeting was informed that the KTP start date was the 1st June 2004. Claire Hungerford was introduced to the meeting.

It was confirmed that a formal induction had taken place at the Company and University.

All university staff are subject to a probationary period of employment. The academic supervisor will be required to complete a report at one, three and six month intervals. A formal appraisal conducted by both academic and industrial supervisors will take place at six and eighteen month intervals.

Howard stated that Claire should register on line with the tti and complete the on line KTP module one as soon as possible. Modules two and three are residential courses and should be completed within the first few months of commencement of the KTP. During module two the associate is required to construct a personal development plan. The Associate undertakes a mini project after module two and this is presented in module three. It was confirmed that the topic of the mini project would be determined at the “brain storming session”.

Claire must also complete an on line NVQ registration. Evidenced based information should be gathered during the project and the NVQ level 4 in Management will be assessed by the tti Consultant at the Associate/ Consultant meeting prior to each LMC.

Dr Fielding confirmed that registration for the MPhil had been discussed with the Associate. It was suggested that Claire register with the Society for Applied Microbiology and Society of Dairy Technologists.

It was noted that there is a budget of £3,500 available for associate development. Howard advised that any associate training should be “front loaded” for the benefit of the associate, the Company and the KTP as a whole.

Action: CH

5. IPR/Confidentiality

It was agreed that UWIC relinquishes any claim to IPR in relation to any product developments directly arising from this programme.

In addition any papers written as a result of work undertaken in the KTP would require the authorisation of the Company partner prior to submission and publication.

The meeting was informed that the UWIC confidentiality agreement has been signed.

6. Project Plan

It was agreed that the Gantt chart would be revised to include amendments to the project plan to date.

7. Project Management

Howard reiterated the responsibilities of each party as determined in the joint commitment statement within the KTP Proposal and application form.

Monthly technical meetings should be organised and minuted by the associate and include the industrial and academic supervisors. Evidence of practical experience in “servicing” meetings can
Appendix 4 - Project Meeting

be used towards the NVQ. In addition it is recommended that the academic supervisor spend the equivalent of half a day a week with the associate at the Company.

8. Financial Statement

Anne Barratt tabled an example of a financial statement

It was agreed that any expenditure in excess of £500 required the approval of the members of the LMC either at the quarterly meeting or by email.

It was noted that virements could take place between the Associate Development, T&S and Equipment budgets, although the receiving budget cannot increase by more than 20%.

The purchase of a laptop and printer was approved.

9. AOB

It was noted that the supervisors have booked onto the New Partners Workshop on 29th July 2004 in Bristol

10. Date and Venue of Next Meeting

10.00am Tuesday 5th October 2004 at The Company
V. APPENDIX 5 - LMC 2 PROJECT MEETING
Appendix 5 - LMC 2 Project Meeting

KTP No: 000275
Between
The Company & UWIC
Minutes of LMC2 meeting held on 5th October 2004

Present
David Stokes
Howard Nicholls
Dr Louise Fielding
Dr Ara Kanekanian
David Lloyd
Claire Hungerford
Anne Barratt
Chairman
Recorder

1. Apologies for Absence
There were no apologies for absence.

2. Minutes of Previous Meeting
The minutes of the previous meeting were agreed as a true and accurate record.

3. Matters Arising
It was agreed to cover matters arising as they arose throughout the standard agenda.

4. Chairman’s Report & Programme Overview
David Stokes reported that the market is particularly volatile at present with the balance of business changing constantly.

Profit margins at the company are being eroded as milk producers are taking the impact of price cuts. Fuel prices, raw materials and packaging costs have increased this year. A change in the Common Agricultural Policy has meant that direct “on farm” payments will be made this year. This combined with a reduction in subsidy levels has resulted in a lot of uncertainty about how producers will react to changes.

The changes in the market place will increase the pressure on Claire to produce added value products. The market analysis for the 0.9% fat milk product is being investigated at present.

The raw milk market supplies are tight and the Company are currently behind their quota but it is anticipated that this will be met by the end of the milk year (31st March).

The meeting was informed that from 1st November 2004 new customers would create an increase of 19% in volume of production at The Company.

Anticipated increases in volumes will have an impact of the environmental management of the Company. The application to obtain a permit to operate is a prolonged process involving audits, changes and accreditation under the Green Dragon environmental award scheme.

David confirmed that the original objectives of identifying and introducing new products to the market are still valid.
Good progress has been made on the project. Claire has attended a number of KTP modules, the supervisor course has been attended and inductions at the University and Company have been fully undertaken.
There was a concern that with so much time out of the business Claire would loose focus but this has not been the case.
Appendix 5 – LMC 2 Project Meeting

6. **Associate Report**

Claire Hungerford detailed her objectives achieved to date, current progress of the KTP and future objectives for the next four months.

Claire reported that she has been involved in the introduction of new product “Point 9” by conducting taste tests and receiving feedback from the general public in the Royal Welsh Show; creating labels, posters and advertising materials; seeking trade mark registration advice; facilitating promotional activities; co-ordinating and minuting the weekly meetings and undertaking a telesales role for a marketing company.

The meeting was informed that a profitability analysis has been undertaken for the flavoured milk produced by The Company and this showed that the product is not selling well.

Since the previous LMC the “brainstorming” meeting took place with Claire, David Stokes and academics at UWIC to review four products. This proved to be very constructive.

It was reported that the market audit has proved to be the biggest challenge to date. Paul Buckley, UWIC academic with over 20 years experience in marketing and consumer psychologist has provided invaluable assistance and guidance.

It was requested that Paul become a member of the LMC. This was agreed.

Claire reported that she had attended KTP module 2 and found the project management and PDP aspects useful. The majority of topics covered in KTP module 3 were more relevant. The mini project presented details on the sensory evaluation, research and findings of the “Point 9” product.

Claire stated that her PDP had highlighted short term needs in areas of marketing and management of Company finances.

It was confirmed that the Concept phase of the KTP project is 70% complete and the feasibility phase is due to commence. Short term future objectives (from Oct – Dec’04) include gaining more marketing knowledge with continued input from Paul Buckley; attendance at the Dairy Summit in Paris; increase knowledge of Company finances (possibly through in house experience at The Company for two day course for non financial managers); prepare to present new products to a multiple retailer and investigation in packaging design.

7. **University Report**

Louise Fielding reported that consultation regarding a major restructuring at UWIC is on going and the combination of areas of the Schools of Applied Sciences and Health and Social Sciences is a feasible option. This will bring together all the disciplines allied to medicine and food (including nutrition) into the same School. A course in Nutrition and Food Studies has recently been validated, as has a Masters programme with three themes: Occupational Health and Safety, Food Safety Management and Environmental Risk Management.

The School of Applied Sciences continues to develop a research and consultancy portfolio. A member of staff with expertise in cancer research has been recruited from the University of Wales College of Medicine to boost research in biomedical sciences.

The Food Research and Consultancy Unit has recently been awarded a grant of over £60,000 to assist SME manufacturers with hazard analysis. The recent appointment of a senior scientist and two technicians to develop the laboratory based work for industry has already resulted in two consultancy projects to help manufacturers overcome the problem of resident Listeria.

The new Food Industry Centre build has become a priority for the Estates department at UWIC, who will be taking the design brief to planning application by the end of 2004. A significant level of funding (£3.2M) is required to finance the build and UWIC are currently in discussion with the WDA and a number of major Companies in the food industry sector.
There are 6 KTPs in the School with a number in the application and planning stage.

8. **Supervisor’s Report**  
   **Academic**  
   Ara Kanekanian confirmed the actions detailed by the associate and stated that the project is progressing according to plan. The marketing of the new range of milks and their introduction to the multiples is to be finalised after further discussion with Paul Buckley at UWIC.

   Ara reported that Claire is in constant contact and has a good rapport with all the members of the LMC to obtain relevant information. Claire has been sent information regarding the use of the ultrafiltration system to produce Low Carb milk. This is to be followed up with either Reading or Swansea universities.

   **Industrial**  
   David Stokes stated that he was happy with Claire’s work and progress of the project.

9. **Benefits Report**  
   The meeting was informed that a benefits report is prepared for each LMC based on the minutes of the LMCs to record any tangible benefits derived by all three parties as a result of the KTP. The informal report will be presented at each LMC and will act as an aide memoire when the final report is written at the end of the KTP Programme.

   **Action: AB or JS**

10. **Consultant’s Report**  
    Howard Nicholls reported that since 30th September 2004 the KTP have ceased to be managed by tti Limited on behalf of the Dti and are now managed by Momenta a subsidiary of AEAT. The meeting was reassured that the transition between companies should be relatively smooth and will have little or no effect on the day to day operation of the current KTPs. Howard informed the meeting that the Consultants have been given a six month contracts to assist in the transition.

11. **AOB**  
    None

12. **Date and Venue of the Next Meeting**  
    10.00am, Wednesday 2nd February 2005 at the Company premises
VI. APPENDIX 6 – HEALTHY MILKS

- CONCEPT PHASE EVALUATION
Health Milks
Concept Stage Evaluation

By Claire Hungerford
## Content

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Market Analysis

**What is the relevant market?**

**Age:** Middle age consumers to older 35 – 70+y  
**Health:** Consumers concerned about health issues such as  
  A) Arthritis and flexibility related problems.  
  B) Lack of sleep and high stress  
  C) Consumers concerned about gut health  
**Income:** Consumers with a little spare cash to afford this item regularly and are interested in looking after their health.  
**Location:** Multiple retailer distribution through Wales

Where is the market in its product life cycle?  
In the introduction stage - hence a high amount of awareness and education is needed. At this phase in the product life cycle we need to expect that there will be high advertising costs and difficult pricing decisions need to be made with little information on what the consumer will accept.

What are the key competitive factors within the industry?

**Consumer Concerns:**  
Quality of taste, & if it works ie that the health claims supported by factual evidence.

**Retailer Concerns:**  
Advertising campaign to attract the customers to the product i.e. advertising to educate the consumer of the health benefits of this product.  
**Delivery Service** – regular deliveries of the product as it has a short shelf life.  
**Quality of product** – That the product is ‘safe’ and there won’t be any recall concerns.

**Project Development Concerns**  
Is there an alternative market if the multiple retailers don’t want the product?  
Advertising spend: Do we have the budget to spend what is required to educate the consumer about a new product?  
  a) How much is required?  
  b) How much do we have to spend?  

If the product is successful, it will be very easy to copy – hence we will have to make sure that the brand of the product is very strong.

These products would require a completely different is product distribution system and manufacture process. Hence they will require a great deal of resource.
Competitor Analysis

**Competition: For all Health Milks our main competitors are:**

- **Unilever** – currently have a cholesterol reducing milk hence they could get into this market.
- **Current milk competitors**: Dairy Farmers of Britain, Dairy Crest, Wisemans. They currently do not have competing products however they could develop them if they see that a new product succeeds.
- **Supplement producers**? A consumer could choose between self medication via supplements and self medication through regular staples.

**Balancing Milk** may be competing with the Yacult ‘one shot’ pre-biotic market for customers.

**Flexi-milk** - will be competing with the supplement market e.g:
Neutrataste SportFlex, an Omega-3, glucosamine, chondroitin, vitamins, minerals and herbs combination developed in conjunction with an adviser and nutritionist to the British Olympic team. It is designed to maintain optimum health levels and supple joints, and is targeted at active individuals within the over-35 age group.

**Relaxing Milk** may compete with herbal teas for customers.

Note: to avoid competing directly with these products we need to target consumers who may not try that style of product but will try something that looks like enriched milk.

**Define the market place**

There are no milk products currently on the chilled shelf that target this market.

**Distribution strengths and weaknesses:**

Multiple retailers require direct delivery to central locations hence it would not be a high demand on the company fleet of vehicles compared to our current delivery patterns.

**NPD & Introduction**

Golden Vale has very little history of new product development. Historically several ideas have been identified, however they were not brought to fruition. We are learning as we go along with the project management advertising budgets, capital expenditure, and problem solving.

**Advertising**

We currently maintain a minimal level advertising in the local press and local media. A significant amount of money would be required to launch a new product in a multiple retailer.
Competitor Unilever – has a large advertising budget and much expertise in this area.

**Who are we in the market place?**

We are new comers, and have no history or reputation in this market at present

**Define the market place**

There are no milk products currently on the chilled shelf that target this market. Supplements currently provide an answer to flexibility needs.

**Market Size and Relative Market Share**

Currently does not exist

**What are our resources vs those of the competition**

- **People**
  Manufacturing Skill base: Poor knowledge base – lack of formal training in Dairy. At present we have a fair amount of experience in industry knowledge i.e., quality, food safety, efficiency, however our experience base is diminishing over time due to a poor retention rate.

- **Technology, Research**
  Strength: Access to the University for research and new tests procedures. Weakness: Lack of lab experience – will require training for any new tests

- **Sales Forces**
  OK for current level of sales, however if we were to drive new products forward there may be a lack of resources here.

- **Cash - Limited budget**

- **Trade Relations**
  Good customer links through Rob
  Poor relationship with the buyers of multiple retailers

- **Manufacturing**
  Current capabilities meet our current requirements
  Flexible, can do small volume runs, can react quickly for our current customer base.
  Site is old & equipment is old with little automation = higher labour and maintenance costs.
  We don’t have the economies of scale that Wisemans and Dairy Crest have.
  Higher overheads in labour etc. We will require a capital investment of new equipment to mix ingredients. i.e either a batch system with a mixing vessel or in line mixer
Distribution Channel for All Concepts

Who has the power in the channel?
The retailers have the power – i.e. individual retailers, retail chains or multiple retailers as the customer controls the transport of the product form the depot to the retail stores.

Marketing Mix Analysis

**Flexi-milk**

**Promotion**
Aimed at creating education of increased mobility and flexibility through this drink, and to encourage first trial then repeat purchase.

**Place**
Multiple Retailers

*More information needed: Is there a plan B? More information needed Is there a place we can we sell this where there is a high concentration of elderly people?*

**Relaxing Milk**

**Promotion**
Aimed at creating education of increased mobility and flexibility through this drink, and to encourage first trial

**Place**
Multiple Retailers

*More information needed: Is there a plan B? Can we sell this product in built up urban areas where there is a high volume of people with high stress levels? Could it be suitable for the café scene? Is there a place for this product in beauty /relaxing salons & or retreats?*

**Balancing Milk**

**Promotion**
Aimed at creating education of increased gut health and all round well being.
Appendix 6 - Healthy Milks - Concept Phase Evaluation

Place
Multiple Retailers

**All Healthy Milks**

**Price**
EMS recommends that the price should be set +80% above 'standard' milk product. The rational for this is that the Probiotic yoghurt is 30-50% higher than standard product and Benecol Yoghurt (cholesterol reducing) is 130% above the standard yoghurt price.

**Product**
How does our product fit with the other milks that we manufacture?
It would require a completely different distribution & marketing strategy to our present products.

The impact of this on the business
Increase in the resources needed to manufacture, distribute, sell and market this product.

How will we differentiate my product?
We will need to create a strong brand image with this product as it could be easily copied hence we need to create customer loyalty to the brand.
Customer Analysis

Flexi-Milk

Product Concept:
Fresh Pasteurised Milk
Milk fortified with Omega 3, Glucosamine & Vitamins A & D
- Easy open top for consumers who have joint mobility problems
Shelf Life: 10 days

Target Market
Those who suffering from Arthritis and flexibility or mobility problems.
Demographics: Middle age consumers to older 35 – 70+y

Summary of information still needed:
- Extended shelf life: this would provide greater flexibility in the distribution chain
  be of great benefit to our customers.
- Our strongest competitor would be supplement companies who produce a
  combination of products that aid flexibility.
- More information needed on the consumer's knowledge of Omega 3
  Glucosamine & Vitamins A & D and their benefits.
- Focus groups would be needed to determine if consumers accept the idea
  flexibility additives being suitable to drink in milk.
- We will need to test the stability of Omega 3 and vitamins over the shelf life.
- Best bottle size for consumer acceptance: Bottle size may have a lot to do with
  consumer acceptance ie a one shot 'medication style' product such as Yacult,
  convenience size, or as a large size take home bottle?

Notes
- Birmingham university Owl Project unit for functional disability testing - may be
  able to test a closure for easy opening for us and indorse it.
- It maybe would be worth patenting easy open cap to protect it from being copied
- By law we are not able to make any claims related to Arthritis as it is a disease,
  however we can make claims about increased flexibility or mobility.
- If it contains a vitamin or mineral additive it needs to conform to Food
  Supplement regulations i.e. have a warning not to consume more than the
  maximum recommended dose.
- It would be advantageous to get an endorsement from a health professional or
  regional sports player that is well known.
- It will be important to promote this product in a way that doesn’t shout ‘drink for
  OLD people’

Makable or marketable product?
Makable: We will need to test the stability of Omega 3 in milk.
Appendix 6 - Healthy Milks - Concept Phase Evaluation

Marketable: Will require large amount of marketing to inform the consumers of the benefits of this product as it will be completely new product to the market.

Potential Market Size
22 % population concerned about Arthritis Wales & South West Functional Foods Mintel
2903 085 population of Wales - 2001 Census
That is 638 678 people
If 10% of these people were interested in buying our milk
That would be 63,867 people.
If Tesco was to stock this product – it has 26.7% market share 17052 people could
buy this regularly (The Grocer – March issue date taken 22/2/04)
Note: The Grocer - September issue showed that Tescos has a 29% share of the market in Barry
and South Wales, hence 26.7% is a conservative estimate)

Estimated volume of milk consumed weekly is 1.776 Litres. Therefore if our target
market consumed only this milk, they would consume 30,284 Litres per week
(6798 Gal/ week)

What is the need Category?
i.e.; A) food/drink B) Safety/ reduce risk C) Friendship D) Status
The predominant need falls into the ‘safety’ category. As the additives may
alleviate physical problems consumers have with flexibility and arthritis.

Who’s buying vs, who is using the product?
Predominantly those buying the product will be those consuming it i.e. people who
have a bit of spare cash, are concerned with their health, and the health of their
loved ones.

Women are the major purchases of food in households hence it is possible that
they will purchase this drink for men or woman in the family unit i.e. for their
husband, mother, father etc.

What is the buying process?
Awareness – information Search – Evaluate the alternatives-purchase – Evaluate
Awareness – as consumer may notice that their lack of flexibility is preventing
them from doing their every day mobility or sport related activities.
Information Search What will help me be more flexible? Education will play a part
i.e. a person may:
- go to the gym and ask for advice,
- go to a supplement shop and look for a solution,
- they may look in the supermarket for pills to take,
- or they may put up with it and do nothing
- or find it in the fresh milk fridge...

Evaluate the alternatives
The customers choice may be based on several factors such as their current price,
amount of effort it takes to gain more flexibility (many people won’t go to the gym
as it requires to much effort), and the taste of the product.
**Purchase**

1st purchase is a trial or test to see if the customer likes the product. Does it look like it taste good & is going to work?

**Evaluate**

Did it taste good? And did it work? If yes – the next challenge is encourage repeat buying - It is important that we develop a habit of repeat purchase.

**Do we intent to segment the market? How and why?**

Yes - Middle age consumers to older 35 – 70+y

Those who suffering from Arthritis and flexibility related problems.

Consumers with a little spare cash to afford this item regularly and are interested in looking after their health.

**Purchase occasion: self medication – to drink at home as a regular part of their diet**

**Question: Is it better to sell this as a one shot ‘medication style’ product such as Yacult, or as a large size take home bottle?**

**What are the perceptions of our product?**

*More Information needed: We won't know this until we do focus groups.*

Cod Liver Oil is the largest single supplement in the UK (Mintel 2002) hence it is conceivable that Omega 3 would be received favourably.

*More research is needed into consumer perception of Omega 3, Glucosamine & Vitamins A & D can be found out from market research*

**Does it meet their needs?**

Expectations: it is expected that the additives will provide a mild improvement to mobility. There is significant amount of scientific evidence to back up the claims for these additives as they have been recommended by the nutritionist to the British Olympic Team.

*Note: By law we are not able to make any claims related to Arthritis as it is a disease. However we can make claims about increased flexibility or mobility*

**Who are the ‘Influencers’?**

Health professionals, friends and family.

Middle aged adults may influence their parents to buy a product that may help them.
**Relaxing Milk**

**Product Concept**
Flavoured milk drink, to be consumed hot or cold e.g. hot chocolate or vanilla or strawberry, honey etc.
Addition of Kava relaxing herb known for relaxing properties
Size: Single survey volume to be defined.

**Target Market**
Target stress relief and bedtime use, potentially used by middle aged to elderly consumers.
Possibly use of Ginseng as it is widely sold in supplements as a stress reliever.

**Summary of information still needed:**
- What would be of Kava and Ginseng effect on children? Will we need to put a
  How much is the Recommended Daily Allowance required to go in the label?
- Will we need to have warnings on this product eg do not drink before for driving?
- In the consumers mind - could this be a drink for a social occasion such as in a café, or is it restricted to home use?

Would this be a regular purchase? Or a treat? This would influence the bottle size chosen.

**Is this a makable and marketable product?**
Makable: Yes dry powder added to milk. A flavour is required to mask the Kava taste.
Marketable: Will require high amount of marketing to create market awareness as there doesn’t appear to be any products on the market at present.

**What is the need Category?**
i.e.; A) food/drink B) Safety/ reduce risk C) Friendship D) Status
The predominant need falls into the ‘safety’ category. As the additives may help a consumer sleep or simply relax.
There may also be some status or friendship ‘needs’ met with this if it is bought in a relaxing type setting such as a café.

**Who’s buying vs, who is using the product?**
Predominantly those buying the product will be those consuming it - people who have a bit of spare cash and are concerned with their health and the health of their loved ones.
Shoppers may purchase it for men or woman in the family unit? i.e. for their husband, mother or father.

**What is the buying process?**
Awareness – information Search – Evaluate the alternatives-purchase – Evaluate
Appendix 6 - Healthy Milks - Concept Phase Evaluation

Awareness – Awareness of the need to relax.
Information Search What will help me relax? Consumers may look to herbal tea, alcohol, supplements or medication.
Evaluate the alternatives
The customers’ choice will be based on taste, whether they think it will work, and price.
Purchase
Evaluate
Did it taste any good? Did it work? Would I buy it again?

Do we intend to segment the market? How and why?
- Middle age consumers to older 35 – 70+y
- Those who have a high stress lifestyle
- Consumers with spare cash to indulge in the concept of relaxation

Purchase occasion:
Self medication – to drink at home
Question: could this be a drink for a social occasion such as in a café’? or is it restricted to home use?

What are the perceptions of our product?
More information needed: what is the consumer understanding of Kava or other relaxing herbs like Ginseng?

This would be a difficult product concept sell to consumers as food labelling law prevents health claims being made on the packaging. Hence, the success of this product would rely on consumers learning about the benefits of these additives through other means.

There has been a product launched recently with a similar product proposition – bedtime milk with increased serotonin. It has been observed that this product has not been selling well in the multiple retailers, this would indicate that there may not be a market need for this product concept.

Does it meet their needs?
Yes, this herb is known to have relaxing properties & we know that consumers take action when they need to relax.
Question: would this be a regular purchase? Or a treat?

Who are the ‘Influencers’?
Middle aged adults may influence their parents to buy a product that may help them. Friends may influence others to purchase it if they like the product or think it is of benefit.


**Balancing Milk**

**Product Concept**
- Pasteurised milk
- Probiotic bacteria and Inulin
- Low fat with added fibre for a smooth full body milk texture
- Shelf Life 10 days

**Target Market**
- Middle age to older age group. Consumers interested in gut health (giving the consumers the opportunity to improve their gut health without the need to take Yacult type of products.
- Every day use / breakfast milk – a 1 stop shop for health and convenience
- Demographics of consumers: 30-50+ overall interest in health and the expendable income to buy this product on a regular occasion.

**Questions:**
Would it be of benefit to add an anti-oxidant for the all around ‘healthy’ milk?
Would this be a convenience drink 500ml or large bottle for the fridge?

**Makable or marketable product?**
Makable: Yes in theory
 Marketable: yes as there are similar ‘one shot’ milk products in the market such as Yacult.

**Potential Market Size**
Not yet known – it is currently difficult to find market research on this product.

**What is the need Category?**

i.e.; A) food/drink B) Safety/ reduce risk C) Friendship D) Status
Gut health: and general healthy lifestyle choice. This product would have a ‘feel good’ factor from treating yourself right.

**Who’s buying vs, who is using the product?**
This product could be for immediate consumption of to take home and drink later. Predominately those buying this product will drinking it. However mothers and fathers could buy it for their family members.

**What is the buying process?**
Awareness – information Search – Evaluate the alternatives-purchase – Evaluate Awareness – Problem digesting food? Or told that they have a problem.
Information Search look around for possible solutions – single shot dairy products or Balancing Milk....
Evaluate the alternatives Does it work? What does it cost? Will it taste ok?
Purchase
Evaluate
Appendix 6 - Healthy Milks - Concept Phase Evaluation

Did the customer like it? If yes you may be able to create a It is important that we develop a habit in the consumers

Do we intent to segment the market? How and why?
Yes, mainly woman in the age range of 30-50y+ middle class social group with expendable income.

What are the perceptions of our product?
We know that consumers are aware of gut health due to the advertising carried out by Yacult, and Datone for the ‘one shot’ style products. Focus groups will need to be carried out to see if customers are receptive to a similar health benefits that could be gained from the Balancing Milk.

Does it meet their needs?
There is a perceived need for consumers to increase their gut health, however market research is needed to see if consumers would believe that this need could be met through a regular drinking milk.

Who are the ‘Influencers’?
Friends& family influence each other to buy this style of product.
Evaluate the Economics For All Concepts

**Launch Costs**

<table>
<thead>
<tr>
<th>Advertising</th>
<th>Cost</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odeon</td>
<td>£200</td>
<td>1/2 page add</td>
</tr>
<tr>
<td>Press Release</td>
<td>£480</td>
<td>PR services - Grange.co.uk</td>
</tr>
<tr>
<td>PowerPoint Presentation</td>
<td>£480</td>
<td>To present to Multiple Retailers</td>
</tr>
<tr>
<td>Cardiff &amp; South Wales Advertiser</td>
<td>£250</td>
<td>½ page add in a advertiser which is free to customers at Tescos, Assdas,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Morisons, Sainsbury's, Safeway and Somerfields in south Wales and Cardiff</td>
</tr>
<tr>
<td>Saga magazine</td>
<td>£1,000</td>
<td></td>
</tr>
<tr>
<td>Grocer</td>
<td>Free</td>
<td></td>
</tr>
<tr>
<td>Food and Drink</td>
<td>Free</td>
<td></td>
</tr>
<tr>
<td>Milk Industry</td>
<td>Free</td>
<td></td>
</tr>
<tr>
<td>Pamphlet drop to areas of high population</td>
<td>1,700</td>
<td>10,000 A5 2 sided pamphlets + the cost of the wages to do this (1500 +</td>
</tr>
<tr>
<td></td>
<td></td>
<td>wages).</td>
</tr>
<tr>
<td>Total Advertising Costs</td>
<td>£4,110</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Point of Sale Material</th>
<th>Quantity</th>
<th>Cost</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label Generation and POS material</td>
<td>-</td>
<td>£950</td>
<td>Creative Services</td>
</tr>
<tr>
<td>Fliers A5 – colour</td>
<td>7500</td>
<td>£1,050</td>
<td>Posted out to all customers &amp; used in tasting sessions</td>
</tr>
<tr>
<td>Posters</td>
<td>250</td>
<td>£120</td>
<td></td>
</tr>
<tr>
<td>Shelf Strips</td>
<td>500</td>
<td>£350</td>
<td></td>
</tr>
<tr>
<td>(No wobblers used)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banner</td>
<td>1</td>
<td>£295</td>
<td>For in store promotion</td>
</tr>
<tr>
<td>Promotional fliers</td>
<td>10000</td>
<td>£1,400</td>
<td>Promotion - arrange with a promoter to run a competition / promotion</td>
</tr>
</tbody>
</table>
Appendix 6 - Healthy Milks - Concept Phase Evaluation

<table>
<thead>
<tr>
<th>Promotion e.g. win a kids bike / Spar vouchers / Rollercoaster rides / bowling for the family...</th>
<th>£1,000</th>
<th>Cost of running a promotion or competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merchandiser / Promoter</td>
<td>3 days a week x 6 months</td>
<td>£3,456</td>
</tr>
<tr>
<td>Point of Sale Total Costs</td>
<td></td>
<td>£8,621</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>£12,731</td>
</tr>
</tbody>
</table>

**Equipment Costs (estimates only):**
New mixing equipment to mix additives - £8,000
Cap applicator as special easy open cap required - £6,000
Change parts for the filler £3,500

Time cost of training of staff – lab staff for new tests
- processing staff for the mixing of the product.

**More information needed to find the cost of:**
- Extended shelf life processing kit - how much?
- Testing equipment needed to verify the amount of additives in the product is correct. Estimate £5000

- Improvement in Hygiene
  - Clean area to weigh out the raw ingredients
  - Controls and training to ensure that powers are mixed & processed hygienically and efficiently. Waste of this product would have higher costs than standard milk.

**Ongoing costs**

Promotional Plan:
Ongoing Advertising -£5000 / year (estimate)

Time taken of internal resources: Problem solving through the product launch and focus on the sales and time spent building good customer relations in the lead up to the launch and for the first 6 months after product launch.

Processing and distribution costs:
- Extra processing costs and time required quality tests required of special ingredients.
- BRC registration
Potential Sales Volumes

Flexi-Milk
RRP – 80% above commodity price as recommended by marketing company

- 22% of the population of Wales and South West are concerned with Arthritis
- 51,138,831 people in England and South Wales in 2001 Census
  - (estimated 2,000,000 people in South Wales as there is 2903 085 people in the whole of Wales)
- Therefore 22% of this is 11,030 542 people.
- If 10% of these people are interested in buying Flexi Milk this is 1,103,054 people
- If TESCO's stocked Flexi milk there would available to 26.7 % of the population therefore people may purchase it. – 294515 people
- At 1.776 L per week that is 523,059 Ltr / week or 87,176 Ltr / day for 6 days per week production.

Balancing Milk
RRP 30% above commodity price

- 6% of the population is concerned by digestion health
- Therefore by the same logic as above 81,924 people, could be able to buy it
- This is 145,497 Ltr / week (31,345 Gal / Week) or 24,250 Ltr / day for 6 day production a week

Relaxing Milk
RRP 30% above commodity price

Minimal market research was found that could indicate the size of this potential market. A more thorough investigation will be needed at a later date. This work was not carried out in this report as it would have exceeded the time limit for completing this section.
Summary

Market Analysis
There is evidence that there is a potential market for functional foods such as healthy milks. This conclusion comes from the observation that functional foods food sectors other than milk have recently been launched in the UK market. The recently launched products have targeted the same consumer group as these products intend to target i.e. consumers with disposable income, concerned about their health, and motivated to try functional products to appease their health concerns.

Competitor Analysis
Large companies are entering the emerging functional food market such as Unilever i.e. Unilever recently launched Benicol the cholesterol reducing milk. Competitors for this functional food sector may not be the obvious white milk competitors; instead they are products that may be consumed at the same meal occasion and claim to improve the same ailments e.g. camomile herbal tea could be a competitor of the relaxing milk.

Compared to our competitors, we are not as experienced or as well resources as those that undertake development of high risk products such as functional foods on a regular basis.

Distribution Channel
Distribution would likely be to customer depots. From which the customer has complete control of the product to the retail outlets. This allows the customer to have control of the distribution chain and normal for this market sector.

Market Mix
Place – Multiple retailers essential to have the place of sale in a location where the product can receive exposure to maximum number of customers.

Promotion – promotion of the fulfilment of a sense of well being and improvement of health due to the added ingredients of the products. See later in the document for details. These products require a great deal more advertising and marketing support than the company’s existing product range.

Price – Minimum increase of 30% greater RRP than that of standard milk. The market would be needed to be tested to evaluate what price would be acceptable for these added value products.

Product – Launching one or more of these healthy milks would require a major improvement in the associated skills within the business as well as the production facilities.
Customer Analysis

The analysis of the available market research showed that consumers interested in maintaining their health may purchase products such as the concepts proposed.

These products meet the emotional need to reduce risk of harm / provide safety. The meal occasion could be a café location or at home a drink at breakfast or for the evening meal.

Who is buying it / using it: It is thought that predominantly those buying the product will be those consuming it - people who have a bit of spare cash and are concerned with their health and the health of their loved ones.

Market segment to target: Middle age consumers to older 35 – 70+y

Who are the influencers?
Middle aged adults may influence their parents to buy a product that may help them. Friends may influence others to purchase it if they like the product or think it is of benefit. If it was possible to receive an inducement from a known health organization this would have a positive influence on the public.

More research would be needed to assess whether consumers would acceptance the concept that health additives in milk having a positive effect on their health. To find this out focus groups will be needed to carried out.

The estimated customer demand for these product concepts would provide a significant challenge to the current production facility; however it appears that this would not be a constraining factor to the project. As the Production Manage is confident that the factory could handle the impact of this volume by re-organising the production schedule.

Evaluation of the Economics

There are significant initial capital costs and marketing investment that would be needed if these products were to be launched. This must be considered carefully as launching a completely novel drink to the UK market is the most risky product development venture that can be undertaken.
VII. APPENDIX 7 - PAYBACK ANALYSIS
Flexi Milk Return On Investment

Scenario 1
This has been costed WITH glucosamine as an ingredient
Delivered into Tesco depot at Chepstow. The product will be packaged in crates in 1 litre bottles

This scenario has been worked developed from the constraint of 14000 Litre/week capacity not from the potential market size.
RRP assumed to be 80% greater than standard milk.

Revenue Generated per Litre sold

<table>
<thead>
<tr>
<th>Potential Annual Volume</th>
<th>£3313,394 (potential market size in litres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>74,722 (litres / day) 312 days of production a year</td>
<td>(or 16437 gal/day)</td>
</tr>
</tbody>
</table>

Pack Size: 1 litre
Crates: 12 packs per crate
Constraint: 14,000 litres/day with existing capacity
RRP: Standard milk + 80% £0.78 /litre
Retailer margin = 35% £0.27
GVD revenue per litre (excl. VAT) £0.483 £/litre

Costs per Litre

- Standard milk Semi skimmed - spot market price £0.21
- Cream Yield £0.008
- Omega Pre-mix (powder) kg per litre 0.0024 With Glucosamine - £23/kg addition rage of 0.73g / 300 ml serving £0.055 Without glucosamine - £315/g addition rage of 0.22g per serving

Primary packaging
- Bottle cost £0.06 (extra cost to be incurred if a different bottle shape is used)
- Packaging £0.002 (excessed crates used)
- (Cost per year) £7,875 Calculated on annual spend of £7875 over achievable volume of 14000 litres/day
- Labour St/M advantage £0.02
- Delivery Chepstow £0.003
- Fuel £0.002
- Driver £0.004 (loader wage costs £300 / week - this cost was recommended by David Bine)
- Wastage = sum of milk, packaging, and labour in up to but not including driving and loading = 1%

Contribution per Litre (Per Litre: Cost - Rev) £0.11
% return 22%
Annual Contribution £468,542

Ongoing Costs - Per Year

- On going Marketing £7,000
- BRC Registration fees £400
- Engineering £5,000
- Depreciation £2,400
- Consider any other company costs size of project Nigel H & David Stokes input required
- Estimate - actual value needs to be found £1,000

Net Profit £452,742

Capital Expenditure

- Mixing Equipment (Bob thought about 8000, however Nigel has put a similar piece of kit in for dry powder mixing at 12000)
- Cap applicator 12000 this needs to be checked with Bob £6000
- Change parts 4000
- Installation 2000
- Total 24000

Cash Flow

- Product contribution 453 453 453
- Percentage uptake of the 14000 L 25% 50% 75%
- Start up costs
- Capital 24 0 0
- Advertising 13 0 0
- Marketing Support 10
- Cash flow (x1000) per year

Payback 193 days

Appendix 7a - Page 1 of 2
Flexi Milk Return On Investment

Scenario 2
This has been costed WITH glucosamine as an ingredient
Delivered into Tesco depot at Chepstow. The product will be packaged in crates in 1 litre bottles

This scenario has been worked developed from the constraint of 14,000 Litre/week capacity not from the potential market size. RRP assumed to be 30% greater than standard milk.

Revenue Generated per Litre sold

<table>
<thead>
<tr>
<th>Potential Annual Volume</th>
<th>£3,318,294</th>
<th>(potential market size in litres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential Litres/day</td>
<td>74,722</td>
<td>(litres / day) 321 days of production a year</td>
</tr>
</tbody>
</table>

**Pack Size**: 1 litre
**Crate**: 12 packs per crate
**Constraint**: 14,000 litres/day with existing capacity
**RRP**: Standard milk + 30% £0.564 per litre
**Retailer margin**: 30% £0.198
**GVP revenue per litre**: (£3.365) £0.002

Costs per Litre

| Standard milk Semi skimmed - spot market price | £0.210 |
| Omega Pre-mix (powder) kg per litre | 0.0024 |
| Omega/ kg premix | £23 |
| Cost of Glucosamine (0.729/kg) | £0.564 |
| Without glucosamine - £3.15/kg addition rage of 0.229 per serving |

**Primary packaging**
- Bottle: 1 litre £0.060
- Packaging: £0.002
- (Cost per year) £7,875

**Labour**
- Std Manufacturing £0.02
- 0.02 per litre

**Delivery**
- Chepstow Fuel £0.003
- Driver £0.004
- Loader £0.004
- (£0.021 per litre)

**Wastage**
- Contribution per Litre (Per Litre: Cost - Rev) £0.003
- % return 1%
- Annual Contribution £31.694

Ongoing Costs - Per Year

- On going Marketing £7,000
- BRC Registration fees £400
- Annual ingredient testing £1,000
- Engineering £5,000
- Depreciation £2,400
- Consider any other company costs re size of project

Net Profit £25,894

Capital Expenditure

<table>
<thead>
<tr>
<th>Mixing Equipment</th>
<th>12,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cap applicator</td>
<td>6000</td>
</tr>
<tr>
<td>Change parts</td>
<td>4000</td>
</tr>
<tr>
<td>Installation</td>
<td>2000</td>
</tr>
<tr>
<td>Total</td>
<td>24,000</td>
</tr>
</tbody>
</table>

Cash Flow

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>26</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>30%</td>
<td>70%</td>
<td>100%</td>
</tr>
<tr>
<td>50%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>70%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

This figure needs looking at in more detail

Payback 5 years & 43 days
### Balancing Milk Return On Investment

#### Scenario 1

Deliveries into Tesco depot at Chepstow. The product will be packaged in crates in 1 litre bottles. This scenario has been worked developed from the constraint of 14000 Litre/week capacity not from the potential market size. RRP assumed to be 30% greater than standard milk.

#### Revenue generated per Litre sold

<table>
<thead>
<tr>
<th>Potential Annual Volume</th>
<th>5,494,696 (potential market size in litres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma/Day</td>
<td>17,600 litres/day for 315 days production a year</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pack Size</th>
<th>1 litre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crate</td>
<td>12 packs per crate</td>
</tr>
<tr>
<td>Constraint</td>
<td>14,000 litres/day with existing capacity</td>
</tr>
<tr>
<td>RRP</td>
<td>Standard milk + 30% £0.584/litre</td>
</tr>
<tr>
<td>Retailer margin =</td>
<td>35% £0.198</td>
</tr>
<tr>
<td>GVD revenue per litre</td>
<td>(excl. vat) £0.385 £/litre</td>
</tr>
</tbody>
</table>

#### Costs per Litre

<table>
<thead>
<tr>
<th>Standard milk Semi skimmed</th>
<th>- spot market price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cream Yield</td>
<td>0.0763 kg per litre</td>
</tr>
<tr>
<td>Inulin</td>
<td>-0.008 exponent</td>
</tr>
<tr>
<td>cost kg of Inulin</td>
<td>0.053 kg</td>
</tr>
<tr>
<td>Cost received from Lee Wardle</td>
<td>£0.004/ litre</td>
</tr>
</tbody>
</table>

| Primary packaging | Bottle 1 litre £0.060 |
| Secondary Packaging | £0.002/ litre |
| Labour | Std Manufacturing £0.015/ litre |
| Delivery | Chepstow £0.003 |
| Fuel | £0.002 |
| Driver | £0.004 |
| Loader | £0.004/ litre |
| (extra cost to be incurred if a different bottle shape is used) |
| (assumed crates used) |
| Wastage | £0.029/ litre |
| Contribution per Litre | £0.064/ litre |
| % return | 17% |
| Annual Contribution | £280,763 |

#### Ongoing Costs - Per Year

| Ongoing Marketing | £7,000 |
| BRA Registration fees | £400 |
| Annual ingredient testing | £1,000 |
| Engineering | £5,000 |
| Depreciation | £2,400 |
| Ongoing costs = sum of milk, packaging, and labour in up to but not including driving and loading = 1% |
| £0.015 |

#### Net Profit

£264,963

#### Capital Expenditure

- Mixing Equipment 12000 (Bob thought about 8000, however Nigel has put a similar piece of kit in for dry powder mixing at 12000 -)
- Cap applicator 6000
- Change parts 4000
- Installation 2000
- Total 24000

#### Cash Flow

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product contribution</td>
<td>£265</td>
<td>285</td>
</tr>
<tr>
<td>Sales uptake of the 14000 Litre/week</td>
<td>30%</td>
<td>50%</td>
</tr>
<tr>
<td>Start up costs</td>
<td>£0</td>
<td></td>
</tr>
<tr>
<td>Capital</td>
<td>£0</td>
<td></td>
</tr>
<tr>
<td>Marketing Support</td>
<td>£0</td>
<td></td>
</tr>
<tr>
<td>Advertising</td>
<td>£0</td>
<td></td>
</tr>
<tr>
<td>Cash flow {x(1000)}</td>
<td>£32</td>
<td>£132</td>
</tr>
</tbody>
</table>

| Payback | 528 days |

1 Year & 163 days
Scenario 2

Deliveries into Tesco depot at Chepstow. The product will be packaged in crates in 1 litre bottles. This scenario has been worked developed from the constraint of 14000 Litre/week capacity not from the be 80% greater.

Revenue generated per Litre sold

<table>
<thead>
<tr>
<th>Potential Annual Volum</th>
<th>5,493,066  (potential market size in litres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential Litres/day</td>
<td>17,069. (litres) / day for 315 days production a year</td>
</tr>
<tr>
<td>(or) 3973  gallons/day</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pack Size</th>
<th>1 litre packs per crate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crates</td>
<td>125 packs per crate</td>
</tr>
<tr>
<td>Constraint</td>
<td>14,000 litres day with existing capacity</td>
</tr>
<tr>
<td>RRP</td>
<td>Standard milk + 80% £0.782 litre</td>
</tr>
<tr>
<td>Retailer margin = 35% £0.274</td>
<td></td>
</tr>
<tr>
<td>GVD revenue per litre (excl vat) £0.483 £ litre</td>
<td></td>
</tr>
</tbody>
</table>

Costs per Litre

<table>
<thead>
<tr>
<th>Standard milk Semi</th>
<th>£0.210</th>
<th>Spot market price</th>
</tr>
</thead>
<tbody>
<tr>
<td>skimmmed - spot market price</td>
<td>£0.008</td>
<td></td>
</tr>
<tr>
<td>Cream Yield</td>
<td>kg per litre 0.0763 kg</td>
<td></td>
</tr>
<tr>
<td>Inulin</td>
<td>cost/ kg of In 0.053 £0.004</td>
<td></td>
</tr>
<tr>
<td>Cost received from Lee Wardle £265 / 5 tonnes (ie 5000kg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary packaging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottle 1 litre</td>
<td>£0.060</td>
<td>(extra cost to be incurred if a different bottle shape is used)</td>
</tr>
<tr>
<td>Packaging</td>
<td>£0.002</td>
<td>(assumed crates used)</td>
</tr>
<tr>
<td>Labour Std Manufacturing</td>
<td>£0.016</td>
<td></td>
</tr>
<tr>
<td>0.02 per litre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery</td>
<td>Chepstow</td>
<td>£0.003</td>
</tr>
<tr>
<td>Fuels</td>
<td>£0.002</td>
<td></td>
</tr>
<tr>
<td>Driver</td>
<td>Loader</td>
<td>£0.004</td>
</tr>
<tr>
<td>(Loader wage costs £300 / week - this cost was recommended by David Bines)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wastage</td>
<td>£0.029</td>
<td></td>
</tr>
<tr>
<td>Contribution per Litre (Per Litre: Cost - Rev)</td>
<td>£0.162</td>
<td></td>
</tr>
<tr>
<td>% return</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td>Annual Contribution</td>
<td>£707,811</td>
<td></td>
</tr>
</tbody>
</table>

Ongoing Costs - Per Year

| On going Marketing | £7,000 |
| BRA Registration fees | £400 |
| Annual ingredient testing | £1,000 |
| Estimate - actual value needs to be found |
| Engineering | £2,500 |
| Depreciation | £2,400 |
| Consider any other company costs re size of project | David Stokes input required |

Net Profit £691,811

Capital Expenditure

| Mixing Equipment | 12000 (Bob thought about 8000, however Nigel has put a similar piece of kit in for dry powder) |
| Cap appicator | 6000 mixing at 12000 - this needs to be checked with Bob |
| Change parts | 4000 |
| Installation | 2000 |
| Total | 24000 |

Cash Flow

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product contribution</td>
<td>£692</td>
<td>£692</td>
</tr>
<tr>
<td>Sales uptake of the 14k</td>
<td>30%</td>
<td>60%</td>
</tr>
<tr>
<td>Start up costs</td>
<td>£4000</td>
<td></td>
</tr>
<tr>
<td>Capital</td>
<td>£4000</td>
<td></td>
</tr>
<tr>
<td>Marketing Support</td>
<td>£10</td>
<td></td>
</tr>
<tr>
<td>Advertising</td>
<td>£13</td>
<td></td>
</tr>
<tr>
<td>Cash flow (£1000)</td>
<td>£167</td>
<td>£346</td>
</tr>
<tr>
<td>Payback</td>
<td>107 days</td>
<td></td>
</tr>
</tbody>
</table>
VIII. APPENDIX 8 - PRESENTATION FOR LMC 3
GV Product Development
KTP 000275

Achievements at GV
- Healthy Milks
  - Completion of the Concept Stage
- Progress in the Feasibility Phase
  - ROI
  - Technical Specifications
  - Experimental Work
  - Labeling Regulations
  - Tender for Graphics Work
- Quality Improvement Project

Associates Report
- Review Of the Last 3 Months
  - Achievements at GV since LMC 2
- SIAL Trade Show
- World Dairy Summit
- PDP
- Timeline For The Next 3 Months

SIAL
- Akins
- Suppliers of Functional Ingredients
- Summary of Trends & Innovations
  - Plant sterols, Prebiotic yoghurt drink, Omega 3 Milk, Healthy Smoothies, Aloe Vera yoghurt drink.
- Bottle Designs Of Milk Drink

World Dairy Summit
- Products Found:
  - Heart Plus – Omega 3 milk sold in Australia
  - Vital – Omega 3 milk sold in New Zealand

More Products...
- Big M – Flavoured milk brand leader, this is sold in a milk carton
- Low Carb Milk – Sold in New Zealand

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Seminars

- **Nutritional**
  1. The relationship between the reduction of coronary heart disease and the consumption of dairy products
  2. The correlation between muscle development and the consumption of dairy protein

- **Marketing**
  - Successful formats for innovation within companies
  - Successful marketing and branding strategies

Personal Development Plan

- **5 Year Goals**
  - NPD Manager
  - Long Term Goal - General Manager

- **Development Needed**
  - Marketing
  - Finance - ROI, Profitability

- **Actions Points**
  - Marketing Knowledge: Dairy Summit, SIAL & input from Paul Buckley
  - Finance Knowledge: Experienced gained through project work and the course - Finance for Nonfinancial Managers

Product Development at GV

**Where Are We At?**

- **Low Carb Milk** - Not Likely
- **Flexi-Milk** - On Hold
- **Balancing Milk** - Yes
- **Flavoured Milk** - Needs Attention
- **Point 9** - Needs Attention

Stage Gates Process

- **Idea Generation & Initial Screen**
- **Stage 1 Concept Phase**
- **Stage 2 Feasibility Phase - In Progress**
  - Present to Multiple Retailers
- **Stage 3 Development Phase**
- **Stage 4 Testing & Validation**
- **Stage 5 Full Production & Market Launch**

Feasibility Stage - In Progress

- **Actions Complete**
  - Return on Investment
  - Technical Specification
  - Regulations Reviewed
  - 1st Stage of Experimental Work
- **Issues to Resolve**
  - Legislation Advice Needed
- **Actions Outstanding**
  - Taste Panels & Shelf Life Testing
  - Bottle Selection & Label Design
  - Feasibility Report to Write

Timeline - February to April

**Priorities**

1. **Quality Improvement Project** - 2 Weeks Work
2. **Flavoured Milk & Point 9** - Action Plan to be Formulated
3. **Healthy Milks** - Prepare to Present to Multiple Retailers - Flexi-Milk & Balancing Milk
Thank You
IX. APPENDIX 9 - LMC 3 PROJECT

MEETING MINUTES
Appendix 9 LMC 3 Project Meeting Minutes

KTP No: 000275

Between

The Company & UWIC

Minutes of LMC3 meeting held on 7th February 2005, 9.30am

Present

David Stokes
Howard Nicholls
Dr Ara Kanekanian
David Lloyd
Claire Hungerford
Anne Barratt
Katherine Scholey

Chairman
Recorder
Meeting Observer

1. Apologies for Absence
Apologies were received from Dr Louise Fielding.

2. Minutes of Previous Meeting
The minutes of the previous meeting were agreed as a true and accurate record.

3. Matters Arising
It was agreed to cover matters arising as they arose throughout the standard agenda.

4. Chairman's Report & Programme Overview
David Stokes reported that the industry in general remains under the same pressures as detailed at the previous LMC. The UK is unlikely to reach the raw milk quota as expected and the shortage of milk, withholding of supplies by the co-operative and pressure from the market place has meant that the milk producers are pushing ever harder for an increase in the price of milk. The Company are paying an extra 3p a litre more for milk equating to more than £0.5m extra than budgeted for.

The Company gained a significant new customer in November 2004.

Clare has attended two major dairy conferences. The Paris European Food Show was disappointing as there is little innovation in the European dairy industry at present. The International Dairy Conference in Australia was very useful in terms of experiencing new products and packaging designs. Clare has been invited to speak at a conference in the UK and this will not only raise her profile but that of the company.

Clare will be involved in the next major business initiative involving shelf life and maintenance of product quality.

David Lloyd stated that UWIC has considerable experience in assessing and improving the shelf life of products through research conducted at the University and academic involvement with previous KTP programmes.

Work on the project has continued at a steady pace. Three new products have been identified, two have been reviewed and the decision whether or not to proceed to market will be taken by Easter.

It was noted that academic input is required for a number of legislative queries.

Action: DL/LF/AK

6. Associate Report
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Claire Hungerford detailed her objectives achieved to date, current progress of the KTP and future objectives for the next three months.

Claire reported that since the previous LMC she has been working on the “Healthy Milks” project. The concept stage has been completed and some progress has been made in the feasibility phase including return on investment; technical specifications; stage one of the experimental work; labelling regulations and a tender for graphics work.

The meeting was informed that there were some interesting topics at the SIAL conference in Paris including Atkins (low carb milk) and a summary of trends, although much of the information from the conference was not new or innovative. The World Dairy Summit in Australia was more relevant to the work being undertaken and new products developed as part of this KTP.

Five new products have been developed to various stages at the company. It is anticipated that work will not continue on the low carb milk, work is on hold on the flexi-milk and work will continue on the balancing milk. The flavoured milk and Point 9 products need urgent attention.

The feasibility study is currently in progress but other future activities include the quality improvement project; development of an action plan for the flavoured milk and Point 9 products and preparation of a presentation to multiple retailers on flexi milk and balancing milk.

Claire stated that as part of her PDP she would like to develop her marketing skills and financial knowledge.

7. University Report

David Lloyd reported that the Schools of Applied Science currently has 5 KTP projects in the food sector. The School continues to be a major player in research in the food sector with several projects with the FSA and in other areas there has been an increase in the number of international PhD students in the environmental risk management courses.

Plans to build a food processing unit and laboratories at the Llandaff campus for the Food Industry Centre continue.

Poor recruitment onto food science courses at UWIC continues to cause concern. Schools have been visited to encourage recruitment and local businesses have supported a bursary scheme and from September 2005 ten students will be given a bursary of £1k each.

On a UWIC wide basis, talks have begun into a possible merger with University of Wales Newport.

8. Supervisor’s Report

Academic
Ara Kanekania confirmed the actions detailed by the associate and stated that he is happy with the work to date although progress has slowed in recent weeks.

There are a number of points that need to be resolved before work on the project can continue “on track” including the improvements in quality systems and greater attention to CCPs within the factory. Claire has completed some good background work to date. This “delay” is in addition to the project plan but will ultimately benefit Claire giving her a greater understanding of all issues surrounding her KTP project.

Industrial
David Stokes stated he was happy with the project.
Appendix 9 LMC 3 Project Meeting Minutes

   A benefits report was presented to the meeting
   It was noted that tangible benefits should be added to the report wherever possible.

10. Consultant’s Report
    Howard Nicholls stated he was happy with the progress of the KTP, congratulated the programme team in the work achieved so far and pleased that technical and quality issues were being tackled in addition to the original project plan.

    The new management company Momenta will continue to provide a consistent approach to supporting current KTPs during the transitional phase. The position of all KTP Consultants has been advertised and most consultants have applied for their current positions. Momenta Advisers will replace the Consultants with effect from 1st April 2005. The NVQ will be supported by the Momenta Advisers.

11. AOB
    None

12. Date and Venue of the Next Meeting
    10.00am, Wednesday 8th June 2005 at University of Wales Institute, Cardiff.