Applying Generic System Archetypes to a 'Beyond the Core' Challenge

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Abstract
We describe an attempt to model an enterprise's expansion into business adjacencies within the scope of a Master thesis. It was crucial to define a strategy that would allow the Master student to grow with the task (gain experience with modelling), at the same time ensuring communication with the client and proving the ability of qualitative SD modelling to deliver insights.

After identifying problem symptoms, the enterprise problem was explored with methods from Chris Zook: 'Beyond the Core'. Six cases from Zook's book offering points of entry for the enterprise problem were cast into generic archetypes and presented to the problem owner. Two archetypes belonging to the "Under-achievement" class were identified as most relevant for the enterprise problem, viz. 1) underachievement due to long distance between the core and the adjacency, and 2) underachievement due to poor adjacency repeatability. We developed a preliminary system dynamics model embedding both archetypes. The model gives sensible results with basic policies affecting distance to the core and repeatability. The preliminary results have strengthened the client's interest in the modelling work. Further joint modelling sessions have been scheduled. Work is still in progress.

Introduction
The first author of this paper – hereafter called 'the modeller' – is a Master student of Industrial and Information Management at Agder University College (AUC), Norway. Equipped with just one semester course in System Dynamics, his modelling

experience is limited. Generic system archetypes were therefore thought of as a means to increase the understanding of both the modeller and the client.[1]

The purpose of this paper is to:

1. Evaluate the usefulness of archetypes in reaching a final project definition.
2. Evaluate the use of system archetypes to anchor the stock-and-flow model around the main anticipated problem and policy structures.
3. Evaluate the archetypes ability to communicate insights and ideas to people with little knowledge in System Dynamics.

In addition to discussing the adequacy of the method, we hope that this paper adds a few interesting instances to the collection of system archetypes.

The client, the SCA Group[2], is an international paper company with roots in Sweden. The SCA Group consists of SCA Packaging, SCA Hygiene Products, SCA Forest Products and SCA North America. SCA Packaging UK is a part of SCA Packaging.

In order to meet consolidation in the retailer segment, SCA Packaging UK has been expanding into adjacent business areas, which is one of the greatest business challenges. Of the top 25 business calamities (excluding internet related ones) from 1997 – 2002, adjacency expansion failures played a major role in 75% of them (Zook 2004, p. 2). The management of SCA Packaging UK is aware of the risk and it has taken the challenge seriously. It testifies to their will not to let any stone unturned that they also have incorporated SD modelling by a Master student as part of their approach.

A recent book entitled 'Beyond the Core' (Zook 2004) explores the subject of adjacency expansion in depth. The book describes in detail a number of problems that often arise in adjacency expansions.

Section 'Adjacencies' defines adjacencies. In section 'Preparatory meeting' we describe the initial discussions with the client, leading to the adoption of 'Beyond the Core' approach and the subsequent application of system archetypes to 'Beyond the Core' problems. In section 'Beyond the Core' Archetypes we describe a number of applied generic system archetypes and their solutions developed from 'Beyond the Core' (Zook 2004). In section 'Further Archetypes for SCA Packaging' we describe other relevant archetypes that are not directly based on 'Beyond the Core'. Section 'Project Definition Meeting' discusses the archetypes relevance to SCA Packaging UK and how they were instrumental in reaching the final project definition. Section 'Preparations for Thatcham Workshop' describe the preparations for the second meeting in England. This includes the creation of four system archetypes and the initial model based on these archetypes. In section 'Preliminary Model' we describe the model developed prior to the Thatcham workshop. Section 'Preliminary Model Results' shows the simulation of two scenarios, 'Zero Core Distance' and 'High Core Distance'. Finally in section 'Conclusion' we evaluate the usefulness of generic system archetypes in defining the project.

[1] The client had general knowledge about SD and Systems Thinking.
[2] SCA stands for Svenska Cellulose Aktiebolaget, s. http://www.sca.com/

Adjacencies

Zook (2004, p. 5) defines adjacency moves as strategies that have three distinctive features: “First, they are of significant size, or they can lead to a sequence of related adjacency moves that can lead to substantial growth. Second, they build on, indeed are bolted on, a strong core business. Third, adjacency strategies are a journey into the unknown, a true extension of the core, a pushing out of the boundaries, a step up in risk from typical forms of organic growth.”

Adjacency expansion can take many different forms: new businesses, movement up and down the value chain, new channels, new customer segments, geographic expansion and major new product launches.

Preparatory meeting

On 17 December 2004, master student Finn Olav Sveen, Professor Jose. J. Gonzalez and PhD fellow Magne Myrtveit, hereafter called the modelling team, had a videoconference with CEO John Williams of SCA Packaging UK and Research Director Dr. Richard Sanders of SCA Packaging Coordination Centre NV in order to gather information and agree on a preliminary project specification.

John Williams opened the meeting, focusing on retailer consolidation. The retailers consolidate to gain higher bargaining power, taking away more and more of SCA Packaging UK’s and other suppliers’ power in the value chain. In order to meet this challenge, Williams asserted that the company had to become something more than just a packaging producer. SCA Packaging UK had to grab a bigger chunk of the value chain, adding more value to the product in order to stay profitable; specifically, to go beyond being a pure packaging producer and also package the product for the client.

Williams strongly recommended the recent book “Beyond the Core” (Zook 2004) as a departing point for our analysis. In the book, Zook analyzes adjacency expansion as a tool for growth. It was agreed that it would be of most interest to SCA Packaging UK if the Master thesis focused on adjacencies within SCA Packaging UK and strategies to execute them successfully while avoiding pitfalls.

The modelling team needed an appropriate tool of communication. System Dynamics models can be inherently complex and difficult to understand for the uninitiated. Archetypes can assist model conceptualization by virtue of their isomorphic properties to transfer thinking from one domain to another (Wolstenholme 2004, p. 2). Archetypes also have a use at the back of the modelling process as a means of collapsing down insights from the model (Wolstenholme 2002, p. 9). It was decided to use archetypes as a tool of communication. It was hoped that archetypes initially could help to initiate discussion and anchor the stock-and-flow model around the main anticipated problem and policy structures. Hopefully, archetypes could also be used at the end of the modelling process. They would then be used to convey essential lessons learned. The modelling team and SCA Packaging UK agreed on a follow-up meeting in February 2005 for the purpose of settling on a final project definition. The system archetypes described below were input for that meeting.

'Beyond the Core' Archetypes

What are System Archetypes?

Experience shows that most actions result in unintended outcomes (UC), in addition to the intended outcome (IC). An example of this is the construction of roads to relieve traffic congestion. For a brief period after the construction, traffic flows smoothly and the cure, building the new road, seems to have worked. However, the new road increases the attractiveness of using cars, thus more people will buy and use cars instead of public transportation. After some time the traffic congestion will be just as bad as it was before. In this case the intended consequence is to lower the traffic congestion; the unintended consequence is the traffic congestion due to attractive roads. Most people fail to see the non-linear feedback structure that causes the UC.

In the business world, as in the rest of the world, we often get repeating patterns. I.e., the same basic model structures occur in many different problems. Over the years a number of basic model structures – so-called system archetypes – consisting of multiple feedback loops have been identified. Wolstenholme (2002) has shown that there are four totally generic system archetypes. They consist of only two feedback loops, the first loop referring to the intended outcome and the second to the unintended outcome. The loops are either reinforcing (R) or balancing (B). The four totally generic archetypes are called 1) Underachievement (R for the intended, B for the unintended outcome); 2) Relative Achievement (R for the intended, R for the unintended outcome); 3) Out of Control (B for the intended, R for the unintended outcome); and 4) Relative Control (B for the intended, B for the unintended outcome).

Wolstenholme showed also that a "solution archetype" exists for each "problem archetype." The solution archetype adds a further feedback loop (it can be reinforcing or balancing, depending on the particular problem archetype) that inhibits the unintended outcome triggered by the intended outcome.

Archetypes are short-hand version of more complex models. Archetypes are almost never detailed enough to facilitate a formal simulation, but they are excellent for communicating insights and knowledge about the dynamics of a system. They can be easily understood by people who have little or no training in System Dynamics.

Wolstenholme (2002) also emphasizes the existence of boundaries and the need to include them in system archetypes (or, for that sake, in system dynamics models). Boundaries exist in all organizations; they may be physical or mental. An action may have unintended consequences in another division of the company, but they are not visible to those triggering the action because of the organizational boundary. Similarly, an action may have to be taken in one division to improve another division. However, the manager of the first division may feel that it is not his problem. Wolstenholme uses the term "system boundary", but a more appropriate term may be a "masking boundary," i.e. a boundary that masks consequences in one part of the system from an actor in another part of the system. The term "system boundary" suggests a boundary that encompasses the system as a whole.

After having read Zook's book (2004) it was decided that the cases with the highest potential relevance for SCA Packaging UK should be translated into archetype style models. The resulting models are found below. Each diagram shows the problem on the left with a suggested solution on the right. The line crossing through the lower loop represents the masking boundary, which can be either a physical or a mental boundary.

Relative achievement – Using too much resources

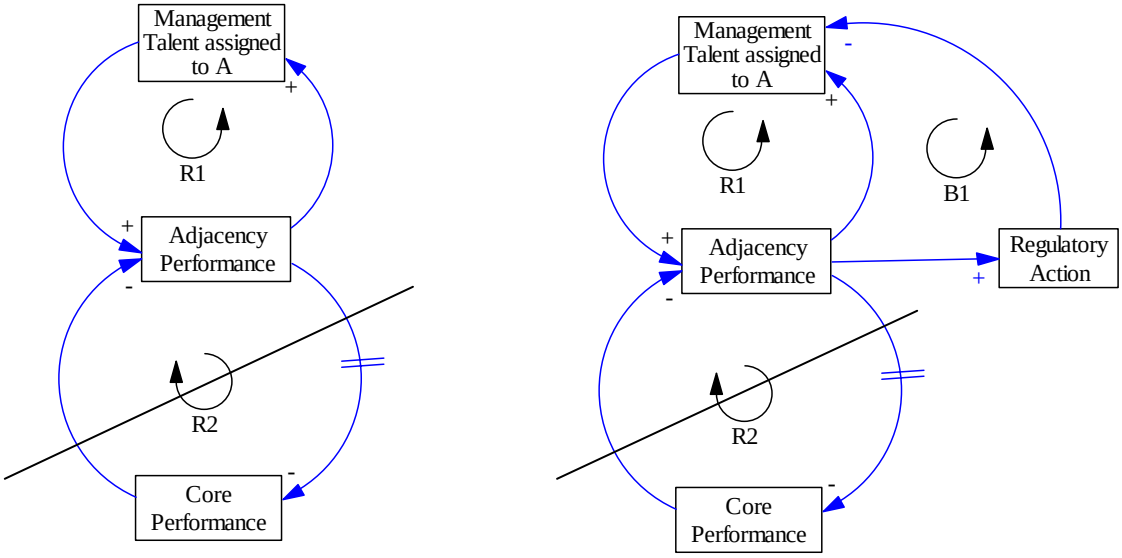

Figure 1 – Relative Achievement – Using too much resources

In large businesses there are often many opportunities to expand into adjacent business areas. The pressure to grow is high in today's business world. Investors demand higher returns on their investments than ever before (Zook 2004, p. 13-15). In this kind of environment it is tempting to move into too many adjacency opportunities, thus diverting too much time and focus away from the core business. Zook (2004, p. 113-116) found that having a poorly performing core also leads to poorly performing adjacencies.

One example is STMicroelectronics and Advanced Micro Devices (AMD). While STMicroelectronics was narrowing their focus to gain leadership in one customer segment, AMD fought on a broad front. AMD dived into many adjacency opportunities, achieving dominance in none. STMicroelectronics went from being a small, poorly performing, government owned company in 1980 to being among the top five microprocessor companies today. STMicroelectronics did this by first reducing their product line and focusing on a few core products. Second, after building a strong core, STMicroelectronics carefully moved into adjacencies, always focusing on the core and the adjacencies linkage to the core. In this way, the core did not suffer from overfocusing on the adjacencies. (Zook 2004, p. 8-12)

Too much resources (in Fig. 1 represented by Management Talent) used on adjacencies can lead to potential underinvestment in the core, degrading the

performance of the core itself. As in AMD's case the company becomes a jack-of-all-trades but a master of none.

Relative achievement – Pan-European vs. Local customers

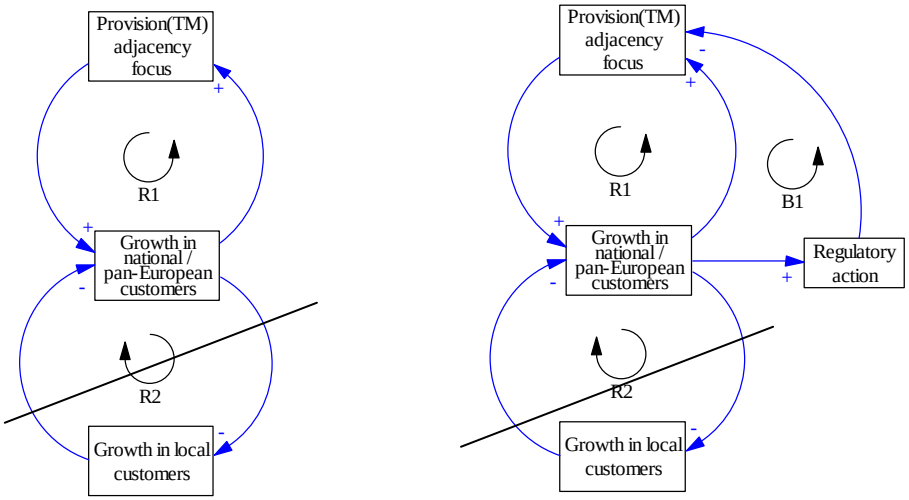

Figure 2 – Relative achievement – Pan European vs. local customers

The majority of SCA Packaging UK's customers are local businesses. However a substantial amount of SCA Packaging UK's customers are national or pan-European. The needs of such large customers and the needs of small local customers are very different. Large customers desire continuous service across the UK and Europe. SCA Packaging UK is developing their Provision™ brand in order to better service these customers inside.

The challenge lies in tuning the business structure to accommodate both national, pan-European and local customers. Handling national / pan-European customers requires a different approach; thus, compromises are inevitable. SCA Packaging UK wishes to focus on their Provision™ adjacency, but still want to provide a high level of service for local customers. As shown in the previous example of an underachievement archetype, too much focus on the Provision™ adjacency may potentially lead to degradation in the performance of both the core and the adjacency.

Underachievement – Distance from the core

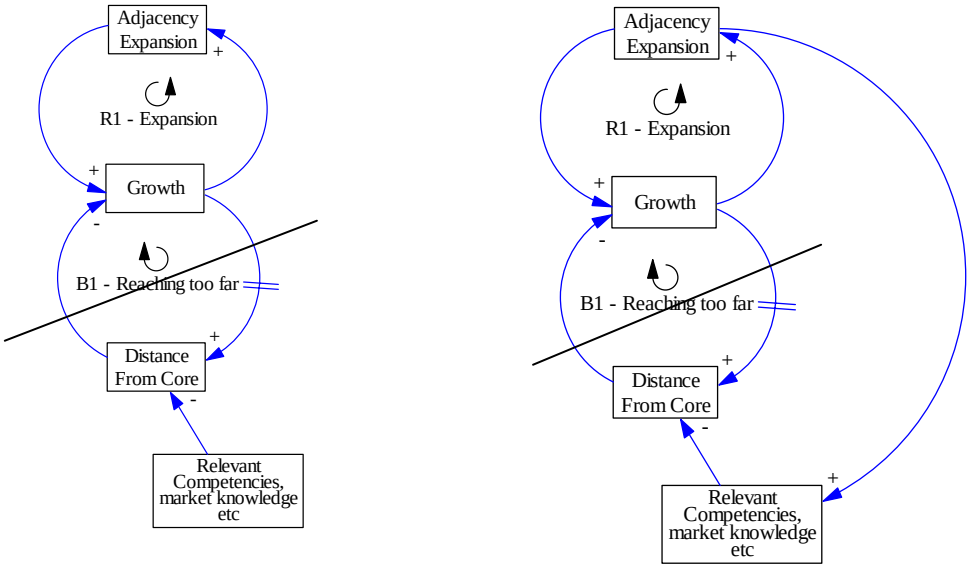

Figure 3 – Underachievement – Distance from the core

There is a danger, when confronted with a seemingly very promising "hot" new market, to jump into adjacencies that lie far from the core business. Relevant competence, market knowledge, etc. might be lacking, leading to a steeper learning curve and the potential for spectacular failure. Many of the best adjacency decisions are the decisions to say no (Zook 2004, p. 191).

Consider a soap manufacturer that ventures into microelectronics. The chance for success in such an attempt is small, as the soap manufacturer's knowledge of microelectronics market conditions, manufacturing competence, etc. is likely to be very limited. Consider a sports example: A weightlifter would probably have to practice a lot to become a top dancer, but a figure skater would probably master it quickly. While dancing is far from the weightlifter's competence, it is very close to the figure skater's competence. The question is how to measure this distance from the core competence:

Zook (2004, p. 86) writes that one useful framework is to think of the economic distance between the core business and the potential adjacency. Economic linkages between the existing business and new adjacencies will in many cases increase the odds of success.

Zook (2004, p. 86-89) explains that the distance between the adjacency and the core business can be measured by shared economics. It is possible for a company to create its own tailored measure, but Zook suggest that a good starting point is to examine five dimensions for identical or only somewhat similar characteristics to the base business. Zook's five dimensions are:

1. Customers: Are they the same as, or different from, those currently served?
2. Competitors: Are they the same as, or different from, those currently encountered?

3. Cost structure: Is the cost structure (infrastructure) the same or different?
4. Channels of distribution: Are these the same or different?
5. Singular capability: If there is a singular capability (brand, asset, technology) that gives the core business its uniqueness, then is this relevant in the new opportunity?

When the characteristics are almost identical the distance is zero, if they are only somewhat similar, estimate the difference in terms of steps from the core. One step away is completely different from the core, while a distance of zero or near zero is an investment in the core itself. To get the total core distance, add together the distance for each of the five criteria.

Moving away from the core dramatically decreases an adjacency's chance of success (Zook 2004, p. 88).

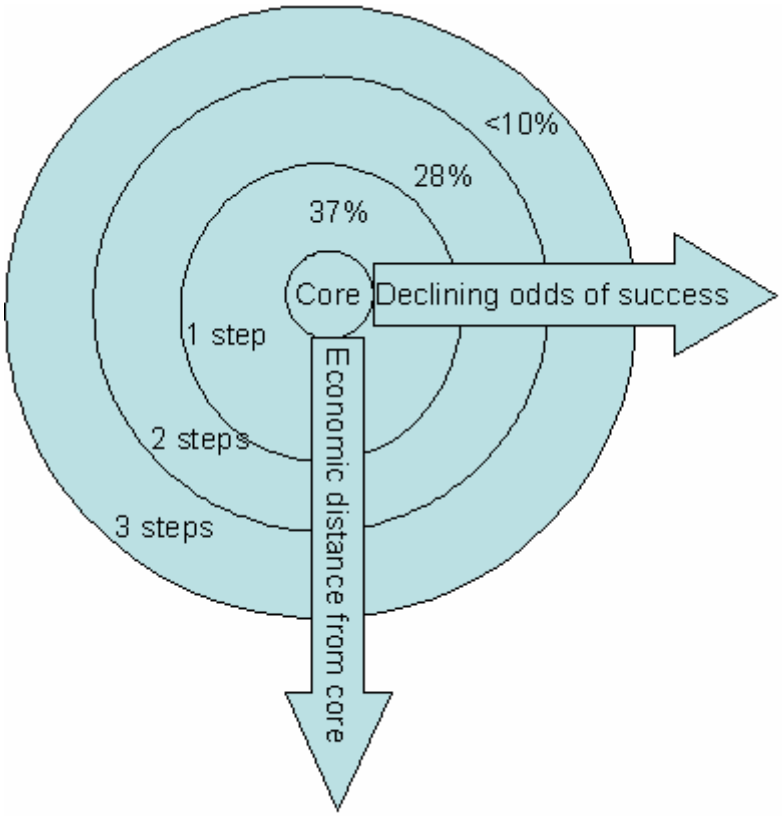

Figure 4 - Chance of Success

Moving only two steps away from the core reduces the chance of success to 28 % or less. This implies that companies should search close to the core for new growth initiatives. However, Zook (2004, p. 88 - 89) also remarks that this does not mean that a company should completely stop investing many steps away from the core. On the contrary he says, all companies should experiment at their boundaries. Still, it is wise to be wary if more than ten to fifteen percent of resources are being invested away from the core.

Underachievement – Synergies with the core

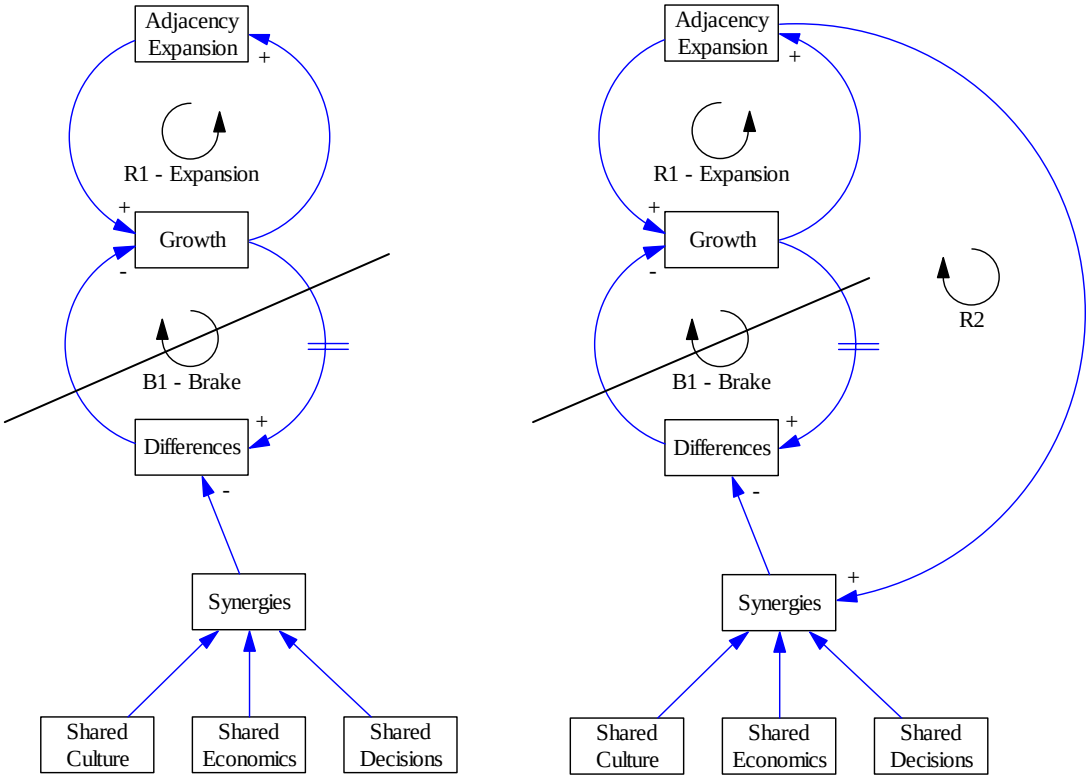

Figure 5 – Underachievement – Synergies with the core

Growing fast in too many directions may lead to a complicated organization which lacks the relevant competence. Ensuring that the adjacencies have synergies with each other and the core makes it easier for the organization to use past experiences and competence. These synergies take the form of shared economics, shared decisions and shared culture. (Zook 2004, p. 144-153)

Shared economics
On the surface, many businesses may have a lot in common, but when you dive deeper into the matter you may discover that the production processes are completely different. In other words, there are no shared economics, no common cost base. (Zook 2004, p. 144-146)

Shared decisions
Adjacencies often require a high amount of coordination with the core. A lot of decisions have to be made, care must be taken to ensure that decisions are not made that will strengthen the adjacency but weaken the core and visa versa. (Zook 2004, p. 146-148)

Shared culture
Differences in culture between organisations may lead to incompatibilities, conflicts and problems. In many organisations things are done the way they have always been done, simply because they have always been done that way. Acquiring a new

business to strengthen the core may actually lead to weakening the core. Differences have to be managed and can therefore draw resources away from the core. Culture can be a powerful factor in the success of an adjacency expansion. Finding good ways to tackle and reduce cultural differences is important for successful adjacency expansion. (Zook 2004, p. 148-153)

Synergies also make it easier for the organization to learn; maybe even forming the basis of a repeatable formula. Zook (2004, p. 35) calls repeatability the first principle of adjacency expansion.

Underachievement – Repeatability

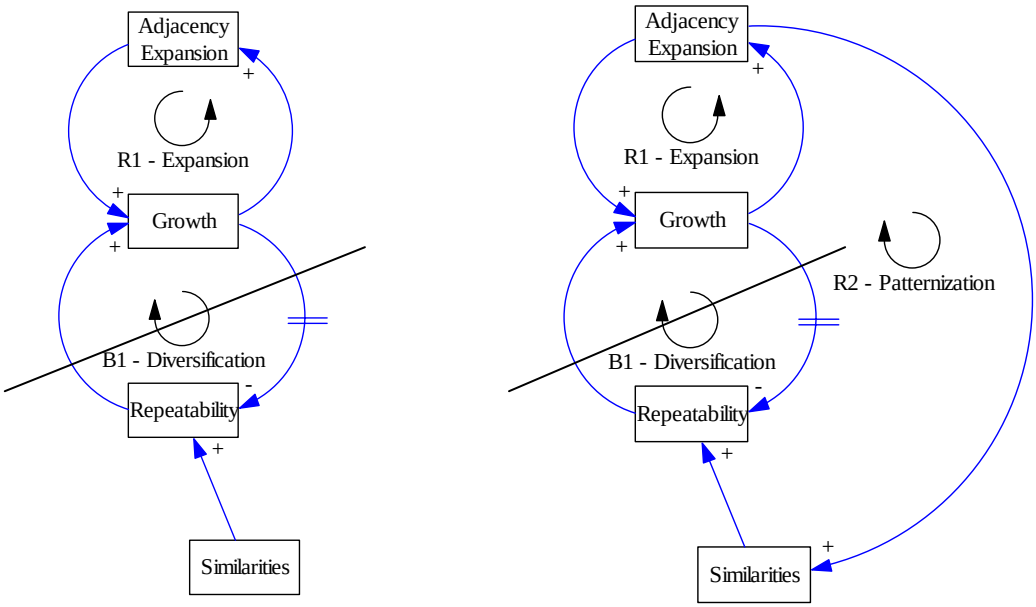

Figure 6 – Underachievement – Repeatability

Repeatability offers the advantage of starting higher up on the learning curve, as opposed to starting at the bottom each time (Zook 2004, p. 44). Starting at the bottom each time would incur higher costs and a steeper learning curve, effectively curbing economic growth.

Reduced Complexity

Repeatability leads to reduced complexity by allowing for fewer organizational variations (Zook 2004, p. 44). More variations lead to increased complexity and reduced visibility. Keeping the complexity down is therefore paramount.

Speed

Speed is another factor influenced heavily by repeatability. Increased speed means increased growth. Repeatability dramatically lowers cycle time relative to the practice of shifting gears from one area to another. (Zook 2004, p. 44-45)

Clarity of communication
Clarity of communication about the growth strategy affects investor and employer confidence. The ability to clearly communicate the growth strategy leads to heightened loyalty because of the increased understanding of company strategy and belief in it. (Zook 2004, p. 45)

Ability to drill down
A critical factor in growth for many enterprises is their ability to understand the details and the execution of business. This ability to drill down goes a long way in explaining why well funded competitors have problems in catching up with companies with well-oiled, repeatable formulas. With every new adjacency expansion, the understanding of the details increases, further fuelling growth. (Zook 2004, p. 45-46)

It is therefore a great advantage if adjacency expansion can be standardized and repeated. For this to happen, similarities and synergies between the old and the newer adjacency operations have to exist. If a packaging operation could be successfully implemented at one customer; perhaps the same operation could be repeated at another with some slight alterations. The probability is high that the organization would get better and better at performing these kinds of operations, thus incurring lower costs and higher operational efficiency.

Underachievement – Failing to understand the customer

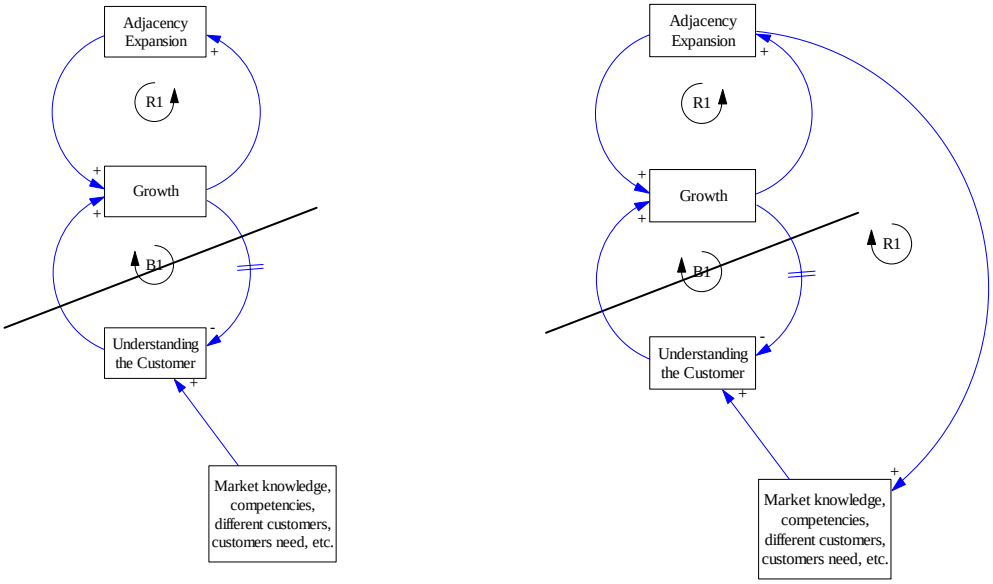

Figure 7 – Underachievement – Failing to understand the customer

When expanding into new adjacencies it is important to consider if your understanding of the market conditions is good enough. Of eighteen successful growth companies that Zook (2004, p. 43) examined, over 80% had a deep customer understanding. Zook (2004, p. 54-71) examines five different aspects of customer understanding, four of which are covered below:

Insights from the customer's profit economics
One of the most profitable ways to identify potential adjacency opportunities is through detailed understanding of the cost and profit economics of key customers (Zook 2004, p. 54). In failing to make this customer connection, however, most companies leave money on the table (Zook 2004, p. 56).
Insights from customer share of wallet
Share-of-wallet is the sale of highly related products to customers you know intimately. Share-of-wallet adjacencies have on average the highest success rate of adjacency types. However, many have pitched their hopes on false share-of-wallet theories. Untested, broad and incorrect theories have formed the basis of many grand strategies. The most important issue becomes testing and deciding before investing. (Zook 2004, p. 56-60)
Insights from understanding life cycle
Identification of share-of-wallet opportunities can be done by looking at the life cycle of the purchases of an individual customer and search for linkages among individual purchases that create a chain of adjacency opportunities. The expansion of PETsMART into grooming and training services in their stores is a good example. Pet owners not only wanted food and accessories for their pets but some of them also wanted extra services. (Zook 2004, p. 60-63)
Insights from customer segmentation
Customer segmentation can create new opportunities by identifying new geographic or customer segments to expand into. It is also possible to take an existing segment and subdivide it. An example is when Dell split its public sector activities into education and government and then further into colleges and universities. Dell uses a slightly different version of its business model for each segment in order to better target them. (Zook 2004, p. 63-64)

Further Archetypes for SCA Packaging

Relative control – The struggle for power in the value chain

This instance of a relative control archetype (se Fig. 8) is based upon information given by CEO John Williams of SCA Packaging UK during the first videoconference on the 17th December 2004.

As the retailers consolidate, they gain leverage and higher bargaining power. They are able to push harder for lower prices and better conditions. SCA Packaging UK must react to this development in order not to fall too far behind and lose too much bargaining power.

The proposed solution, also shown in Fig. 8, is to increase the retailer's understanding of the cost of doing business for SCA Packaging UK. Thus, avoiding consolidation of the profit in one part of the value chain; ensuring that SCA Packaging UK gets a fair share of the profit.

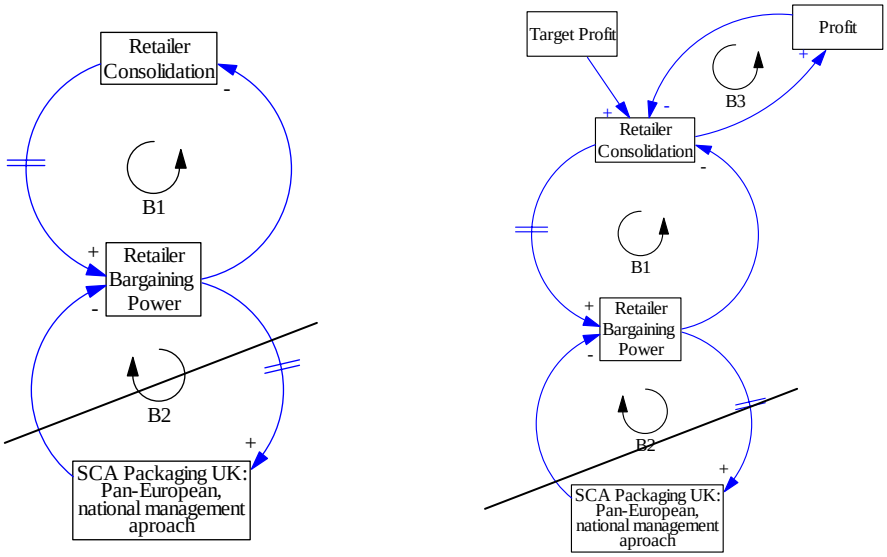

Figure 8 – Relative control – The struggle for power in the value chain

It is natural that all participants in the value chain will try to maximize their part of the profit. One company's actions to gain an advantage will sooner or later be matched by other participants in the value chain. However, falling behind makes it increasingly difficult to get ahead or even achieve a status quo.

Project Definition Meeting

On 14th February 2005 we met again with CEO John Williams of SCA Packaging UK, Research Director Dr. Richard Sanders of SCA Packaging Coordination Centre NV as well as Manufacturing Director Andrew Riddle of SCA Packaging UK.

The system archetypes developed prior to the meeting were used extensively in the discussions. Several of the 'Beyond the Core' issues described above were relevant for the SCA Packaging UK case. The first is 'Relative achievement – Using too much resources'. Currently, compared to the adjacencies, SCA Packaging UK is not earning much money on their core corrugated board business. Adjacencies are only a small part of the total sales but they are a major part of the profit (John Williams). This can indicate that too much time is spent focusing on the adjacencies and not enough time is spent focusing on the core business.

The archetype 'Underachievement – Distance from the core' created substantial discussion. Two adjacencies were discussed in conjunction with this archetype. Contract Packing is a specialised packing service for in store merchandise while Hubbing is an adjacency in the field of supply chain management. Contract Packing has been performing well with relatively few start-up problems. Hubbing on the other hand have not been doing very well, it has yet to turn a profit. At a first glance it seems like Contract Packing is much closer to the core than Hubbing is. Putting something into the box is just one step further. Taking over a supply chain appears further away from the core. 'Underachievement – Synergies with the core' created discussion along the same lines as 'Underachievement – Distance from the core".

‘Underachievement – Repeatability’ was considered interesting. So far the SCA Packaging UK’s adjacencies have been restricted to the UK only. Regardless of this, there is no reason why they can not be implemented across Europe if they are successful. The basic conditions for repeatability would still have to be in place, but a roll out across Europe could mean substantial advantages.

‘Underachievement – Failing to understand the customer’ played a role in the discussion of Hubbing. It was argued that the pricing model for Hubbing was flawed. This could partly be attributed to a lack of understanding of both market conditions and the customer.

‘Relative achievement – Competitors reaction’ was initially dismissed. John Williams believed that the competitors was not aware of what SCA Packaging UK were doing with adjacencies. However, he also pointed out that the most dangerous competitor is the competitor you can not see.

Following these insights, it was then agreed on that the modelling team should concentrate on studying the problem at a strategic level, specifically the handling of two adjacencies already in progress, Hubbing and Contract Packaging. Furthermore the modelling team would be provided with further resources from SCA Packaging UK in order to gain enough research data.

Two workshops in Aylesford, UK, were planned so that the modelling team could work together with SCA Packaging UK staff to develop a detailed system dynamics model. It was suggested that the participation of SCA Packaging UK should go beyond pure providing data and relationships through interviews. An active involvement in the qualitative part of the model would heighten the quality of the process as well as increase SCA Packaging UK’s competence in systems thinking. Follow up videoconference meetings were scheduled to take place once each month. Prior to each meeting, the model would be reviewed by the company.

Preparations for Thatcham Workshop

Due to unforeseen circumstances, communications with John Williams and Andrew Riddel came to a stand still for a period of six weeks. When communications eventually got under way again, it was deemed unrealistic to cover both Contract Packing and Hubbing. It was therefore decided to only include one of them in the research. General Manager Peter Jones of SCA Supply Chain Services, in charge of Hubbing, graciously agreed to meet for a modelling workshop. The workshop would span one and a half day and the participants would be General Manager Peter Jones, Supply Chain Manager David Smy and the AUC team. The team from AUC consisted of Prof. Jose J. Gonzalez, PhD fellow Magne Myrtveit and master student Finn Olav Sveen.

Prior to the agreed on workshop in the UK, a questionnaire was developed and sent to the UK. The questionnaire covered a few basic questions about adjacencies. Peter Jones kindly answered the questions in advance. He also provided the modelling team with a short overview presentation of Hubbing which was helpful as a starting point for preparations to the workshop.

More 'Beyond the Core' Archetypes

Due to the limited amount of information available in advance of the workshop, the input model was based mostly on the system archetypes already developed for the Aylesford meeting.

The four archetypes below were developed specifically for the Thatcham workshop.

Underachievement – The best adjacencies build on and reinforce the strongest cores

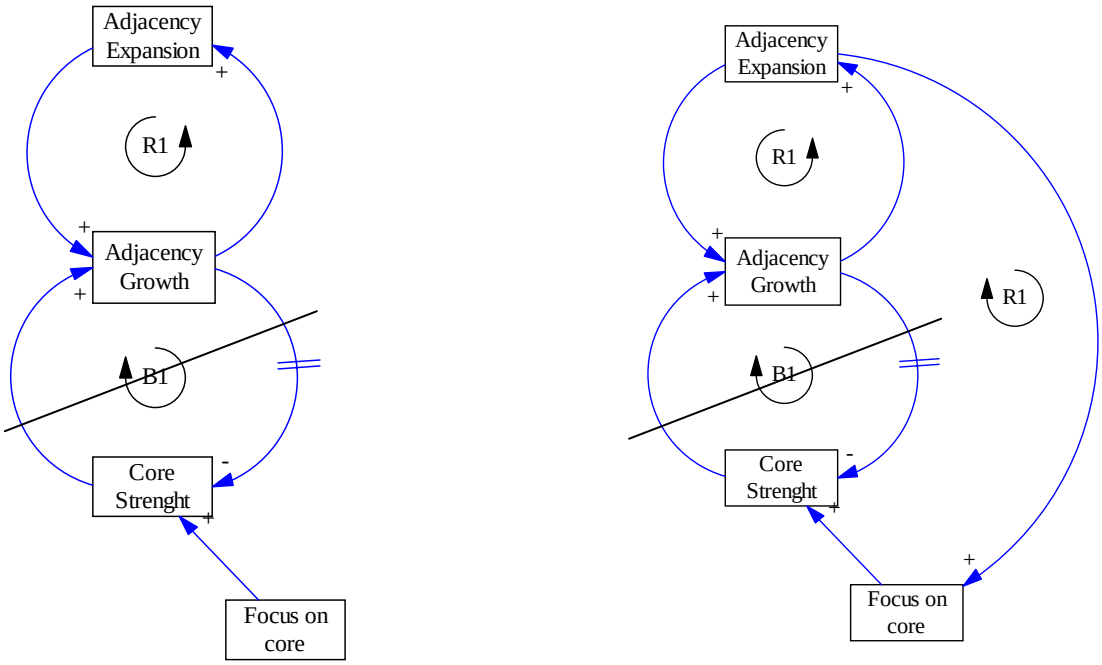

Figure 9 - Underachievement - The best adjacencies build on and reinforce the strongest cores

Zook (2004, p 80 - 89) presents evidence towards the core being one of the most important factors for a successful adjacency implementation. In seven out of twelve pairs studied by Zook's team, the slow value creator clearly and to its peril, moved away from the principle of strong relatedness to the core.

One example he presents is Mattel and its purchase of The Learning Company. Mattel paid $3 billion for The Learning Company and expected the purchase to compliment its core toy business. Two years later The Learning Company was sold to a financial buyer for a price of zero, demonstrating that there was virtually no relationship to the core toy business.

Zook also presents the case of Tesco and Sainsbury: Both started out as similar grocery businesses, however from 1990 to 2001, Tesco's market value quadrupled while Sainsbury grew by only 35%. Sainsbury grew faster and farther away from it's apparently weaker core. It invested in a 100 store chain in Egypt and purchased from Ladbrokes a DIY chain called Texas. In addition, Sainsbury invested in another DIY business called Homebase. Sainsbury is now moving out of both Texas and

Hombase. Meanwhile, Tesco decided to invest resources to strengthen and differentiate its core retail model.

Tesco did eventually invest in adjacencies, but they were tightly related to the strengthened core. Tesco set up in-store pharmacies and coffee shops in stores. They started selling fuel for automobiles, selected kitchen products and optical products. Zook cites Lord Ian McLaurin, CEO of Tesco in this period: “The key to our model was “Keep it simple stupid.” We knew we were a supermarket and only invested in things that we could prove our customers really wanted”.

Underachievement – Focus on industry profit pools

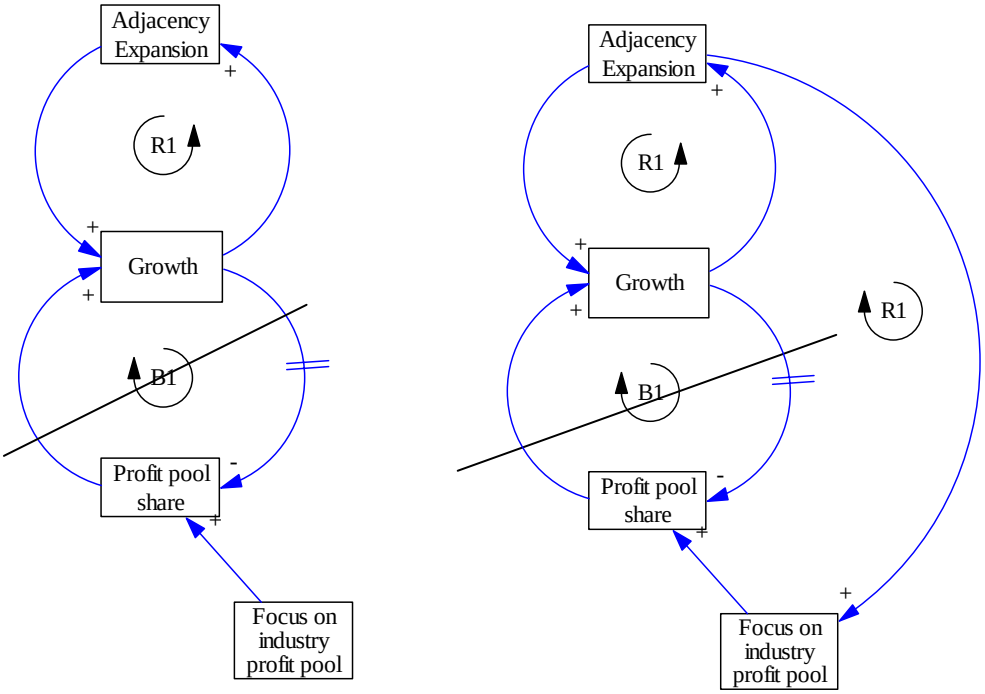

Figure 10 - Underachievement - Focus on industry profit pools

“A profit pool is different from a market. A profit pool evaluation is designed to embody the size of the industry, its current and potential profit dollars, and the extent to which those earnings could cover the cost of capital for leading players” (Zook 2004, p 89). Moving into non existent profit pools can lead to disaster. When expanding into adjacencies, companies must take care to make sure that there is a high possibility for profit.

Underachievement – Insist on potential for leadership economics

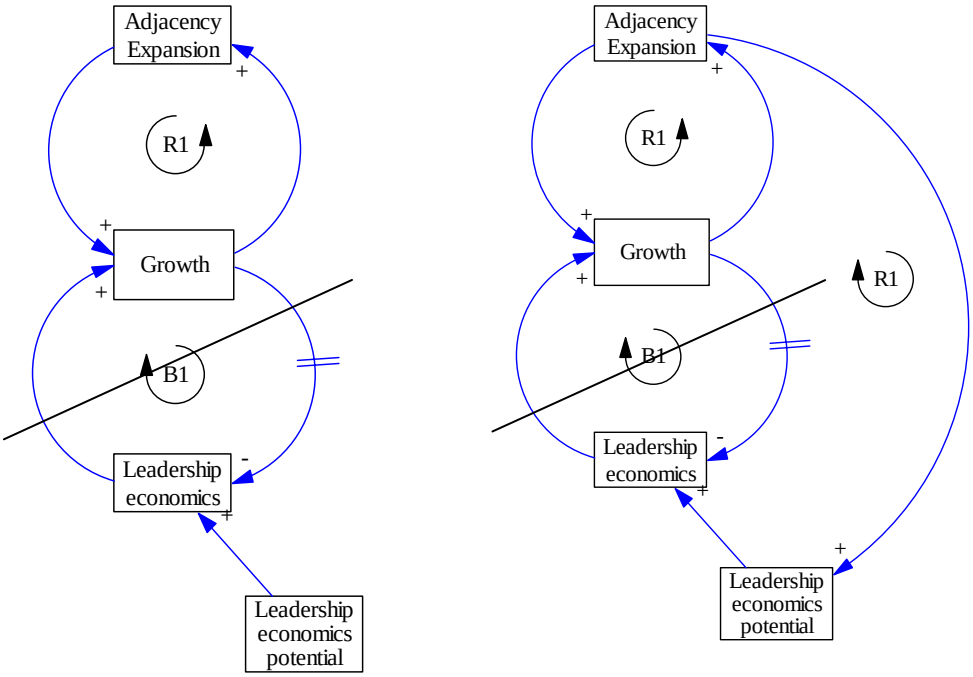

Figure 11 - Underachievement - Insist on potential for leadership economics

A clear view of the reinvestment and cash requirements of the future is required when pushing out the boundaries of a core business. If you do not have the potential to ever achieve economics equivalent to the leader, then you may be constantly out-invested or put in a position of having to match the leader's investment to achieve lower returns. (Zook 2004, p. 93 - 94)

Zook points to the psychology of the human mind to explain this trap. The long term effects of short term decision making in complex environments is difficult to comprehend. Complex environments push out the boundaries of human judgment. The human mind only has a capacity for a limited amount of problems. As the amount of tasks and their complexity increase, the ability of the human mind to handle them decreases. The long term costs can be staggering.

Underachievement – The hidden cost of underperforming adjacencies

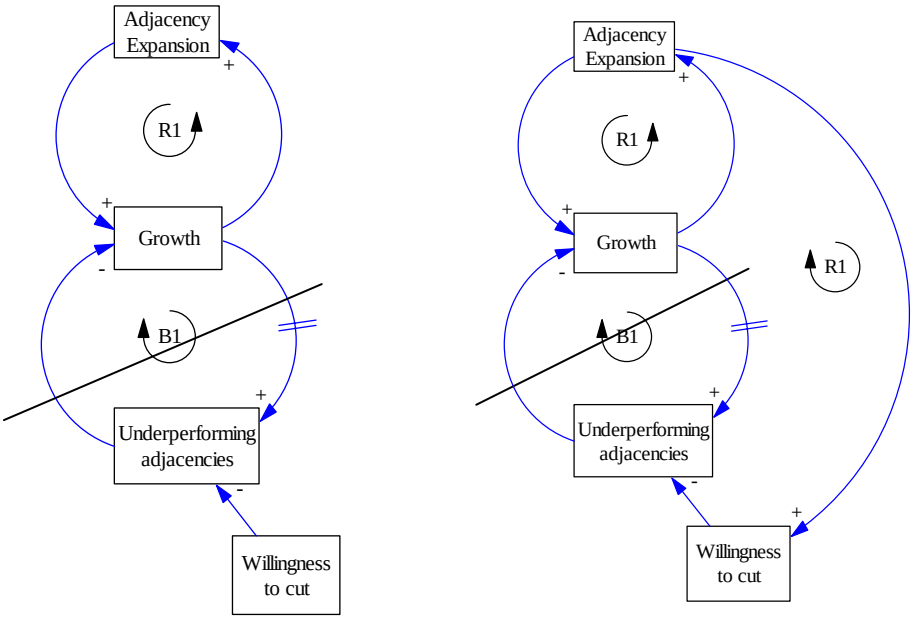

Figure 12 - The hidden cost of underperforming adjacencies

More than half of the companies Zook interviewed indicated they believed there was a natural human tendency to let underperforming adjacencies go on for far too long (2004, p. 167).

Zook (2004, p. 167 - 168) states that there are hidden costs associated with underperforming adjacencies. One cost is the obvious financial and human cost of resources that could be invested elsewhere. They could be invested either in the core or in other more promising adjacencies. A second cost which is more subtle, relates to a company's commitment to results. A badly performing adjacency that is allowed to go on for year after year, suggests to others in the company that it is alright to lose money. The last cost associated with underperforming adjacencies is the cost of complexity from managing too many adjacencies, especially when some are problems.

Initial Stock & Flow model

The six archetypes mentioned were used as a basis for the preliminary stock & flow model. They were used to anchor the stock-and-flow model around the main anticipated problem and policy structures. The initial model was designed as an adjacency machine. I.e., the model was created to cover the basic intended consequence loop that most of the system archetypes have. The loop is 'Adjacency Expansion' causes 'Growth' which causes more 'Adjacency Expansion'. After this functionality was in place, the unintended consequence loops of the archetypes were added one by one.

The model was created with Powersim Studio 2005.

Limitations of the Initial Model

The initial model was intended as a starting point for the discussions in Thatcham and later modelling. It was based on the theories of Zook and the data gained from the questionnaire that was sent to Peter Jones. The model was not intended to be a complete model; the modelling team knew that changes would have to be made to the model as more information became available. The modelling team hoped that the archetypes and the draft model would serve as a tool for initiating discussion; an approach that had worked well at the meeting in Aylesford.

Colour Codes

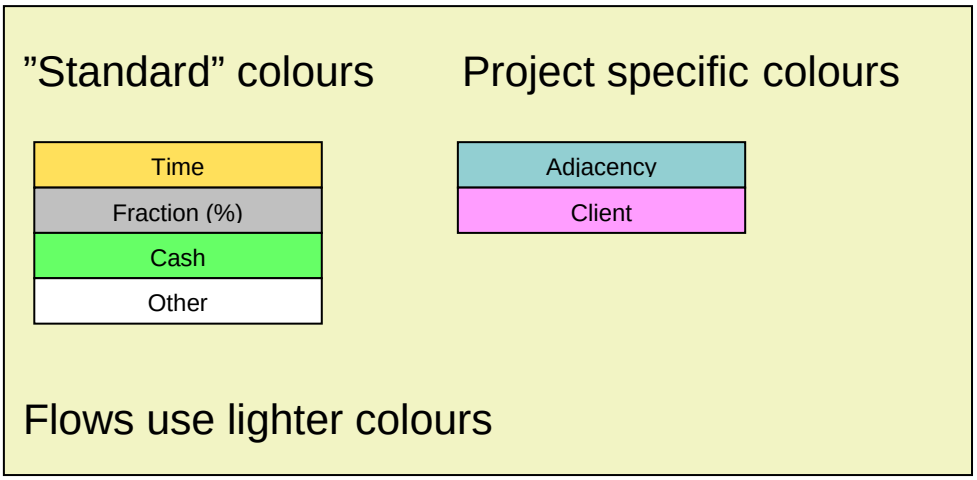

Figure 14

Adjacency Selection

Fig. 15 shows the structure for expanding into new adjacencies, and the effects of adjacency expansion on the core. The core performance is nominally at 100%. Each year new investments have to be made in the core in order to keep up with normal wear and tear which is represented by *‘depreciation’*.

An adjacency has a three stage life cycle. First it must be selected; this is represented by the flow *‘selection’*. The amount of adjacencies that are selected depends on how much money the company wants to use on adjacencies and the *‘cost per adjacency investment’*. A critical parameter is *‘adjacency selection time’*, the shorter the time, the higher the chance of selecting a poorly performing adjacency. A more detailed explanation of this can be found in the next section (Core Distance).

After it has been decided to invest in an adjacency, the adjacency goes into *‘approved adjacencies’* and must be invested in. After investment, the adjacency becomes active, this is represented by *‘active adjacencies’*. An adjacency may become obsolete or be terminated for other reasons, i.e. it does not perform well. This is represented by *‘termination’* in the model. The variable *‘termination’* is affected by the average life time per adjacency.

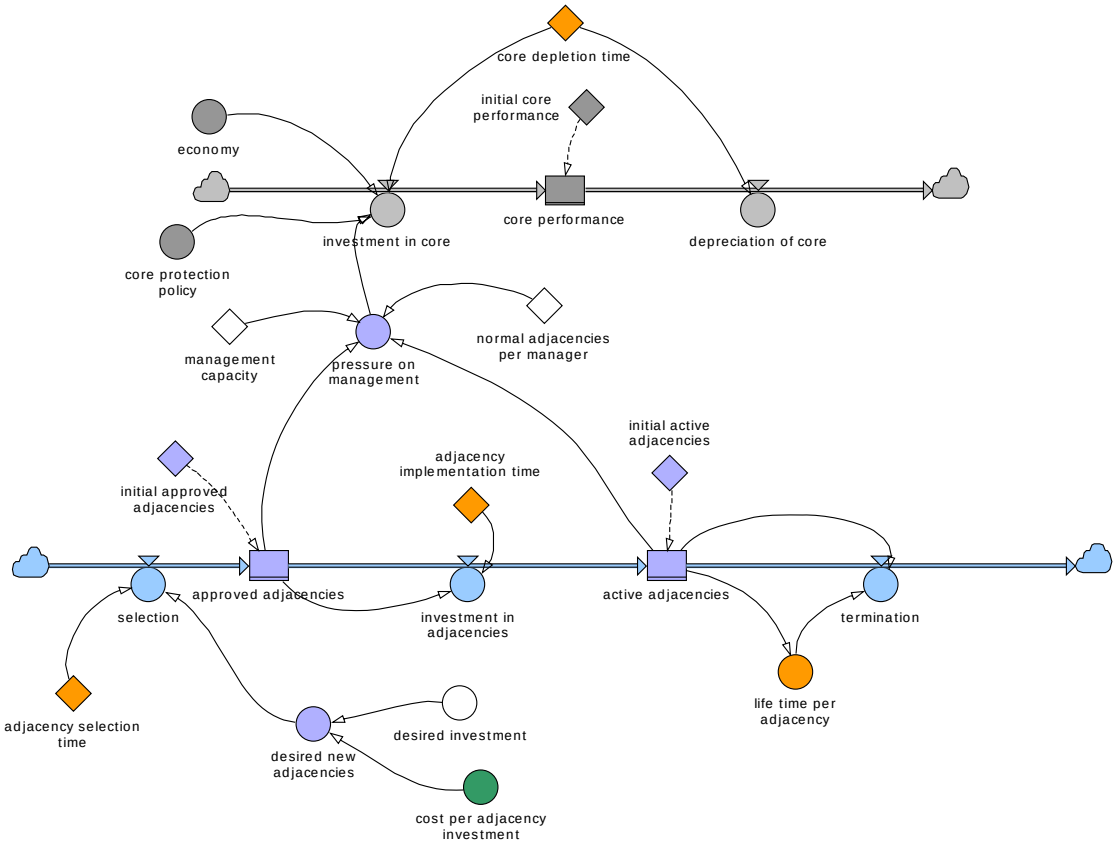

Figure 15 - Adjacency Selection

The amount of approved and active adjacencies will increase the *'pressure on management'*. If this pressure becomes too high and the management spends too much time on the adjacencies, *'investment in core'* may be neglected.

Core Distance

Each adjacency has an economic distance to the core, as shown in the 'Underachievement – Distance to the core' archetype. The 'Core Distance' structure tracks the core distance for each of the five criteria that Zook presents in 'Beyond the Core'.

1. Customers: Are they the same as, or different from, those currently served?
2. Competitors: Are they the same as, or different from, those currently encountered?
3. Cost structure: Is the cost structure (infrastructure) the same or different?
4. Channels of distribution: Are these the same or different?
5. Singular capability: If there is a singular capability (brand, asset, technology) that gives the core business its uniqueness, then is this relevant in the new opportunity?

Fig. 16 shows the corresponding stock-and-flow submodel.

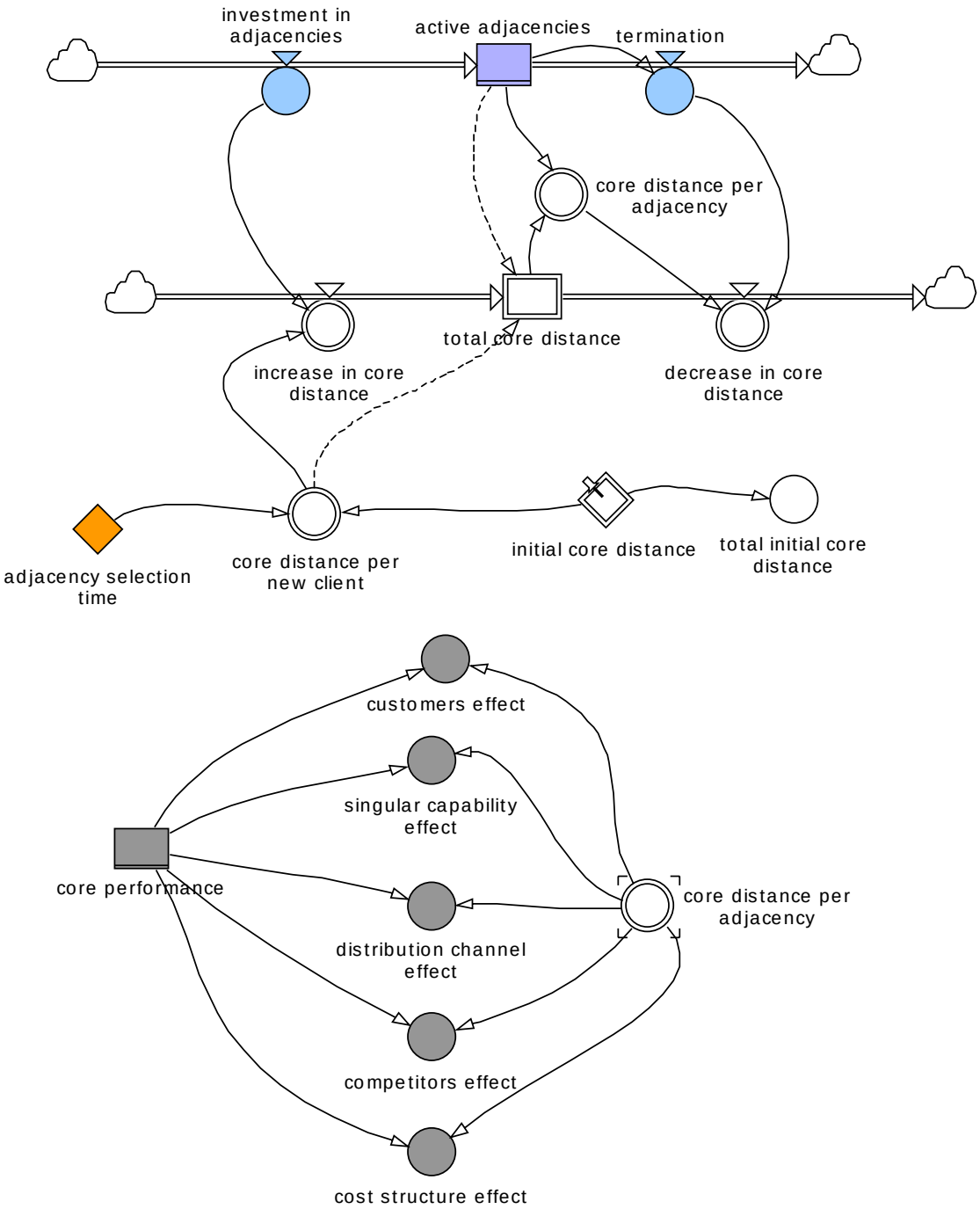

Figure 16 - Core Distance

The core distance is affected by the adjacency selection time. A short selection time represents a selection process that is hurried and flawed, thus increasing the core distance.

Each of the criteria is used in combination with the core performance to calculate the effects of core distance. These effects are then used to affect sales and costs in the model. Specifically *'sales time per new client'*, *'service level'*, *'operational cost per adjacency customer'*, *'sales cost per adjacency customer'* and *'cost per adjacency investment'*. These links can be seen in the diagrams 'Adjacency Selection' and

‘Profit’. If the core performance drops, the distance to the core will have an even greater negative effect than if the core was working at 100%.

Potential Clients

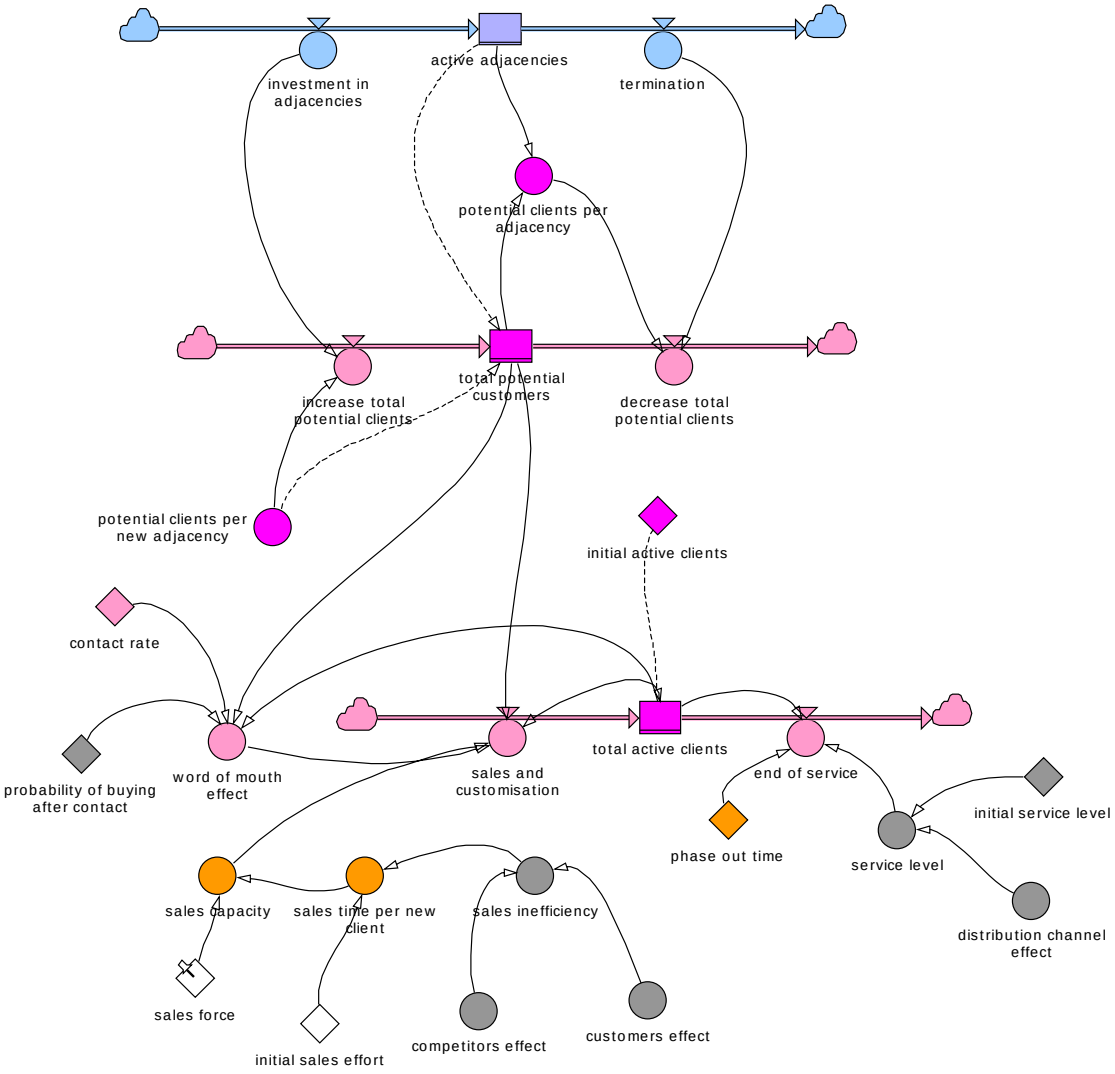

Figure 17 - Potential Clients

Each active adjacency has a potential amount of clients which might become active clients through a sales process. The success of the sales is determined by how well known the product is, i.e. the word of mouth effect, and the company’s direct sales process.

The company’s capacity for direct sales is determined by the size of *‘sales force’* and the *‘sales time per new client’*. The sales time per customer may increase because of *‘sales inefficiency’*. This inefficiency may be caused by powerful competitors or by a lack of understanding of the client.

Once the client has become active it stays so until the service is ended. End of service may have several causes. One is that the customer is not happy with the *‘service level’*, and thus decides to terminate the relationship. Another reason may be

that the product becomes obsolete. The *'phase out time'* represents the average life time for each client. The variable *'phase out time'* is affected by the service level: If *'service level'* drops, so does *'phase out time'*.

This structure covers some of the aspects of repeatability visualized in the 'Underachievement – Repeatability' archetype on page 10. A high number of potential customers mean that the adjacency has some potential to be repeated over several customer segments.

Profit

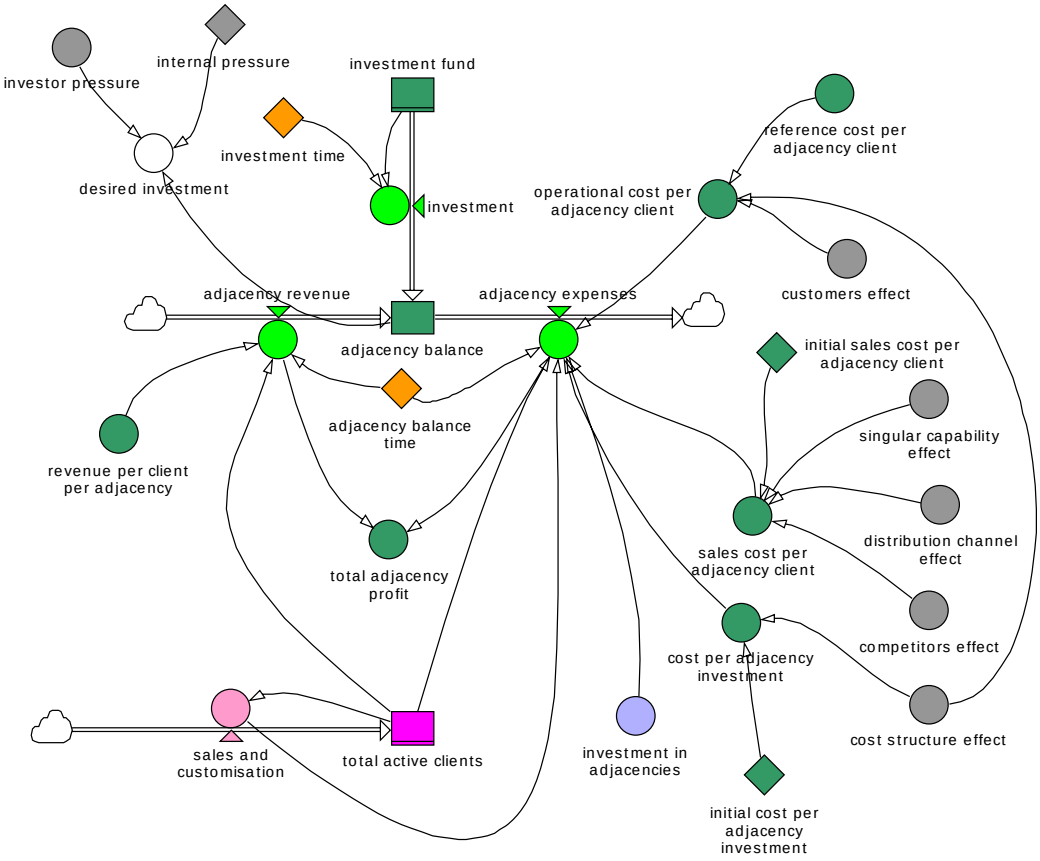

Figure 18 - Profit

In the different stages of an adjacency's life time there are costs involved. Each investment in a new adjacency involves an investment cost, for example set up of new production facilities will cost money. Once an adjacency becomes active, selling the product to potential customers will entitle a cost, *'sales cost per adjacency client'*. Once the adjacency is sold, there will be an operational cost for each customer that is involved in the adjacency, *'operational cost per adjacency client'*. This can be maintenance of production facilities, administrative costs, wages, etc. These different costs are affected by the core distance effects, i.e. the greater the distance effect, the higher the cost.

Each active customer also brings in an annual fee, *'revenue per client'*.

The investment fund represents the initial money that is available for adjacency expansion. This flows in to *'balance'*. After *'adjacency expenses'* have been subtracted, the amount of money available in *'balance'* is the actual money available for investing in new adjacencies. The drivers for adjacency expansion are assumed to be *'internal pressure'* and *'investor pressure'*. Internal pressure to grow can be falling profit, increased competition, etc. Investor pressure stems from the investors demand for return on their investment. The strength of the combined investor and internal pressure decides how much of the available balance is used to expand into new adjacencies.

Preliminary Model Results

Zero Core Distance

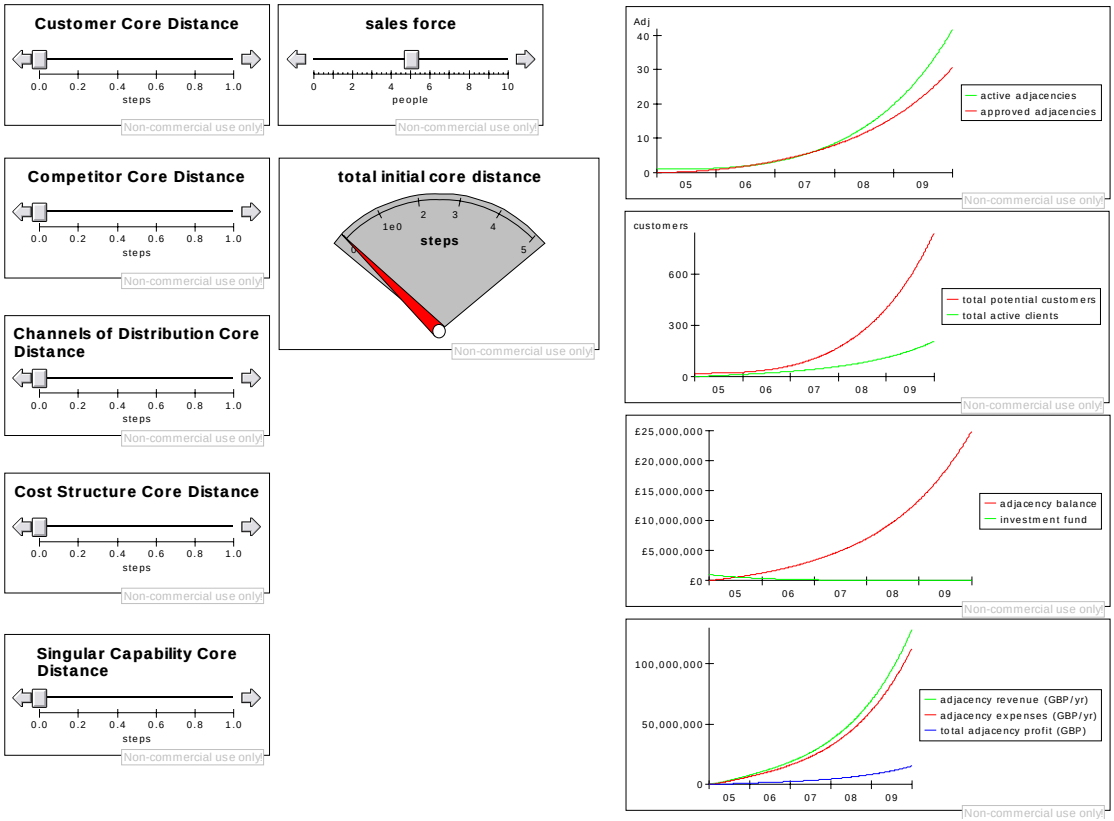

Figure 19 - Zero Core Distance

The results show that with a low core distance profitable growth will continue into the foreseeable future. This is a result of the positive feedback shown in the Fig. 20 below.

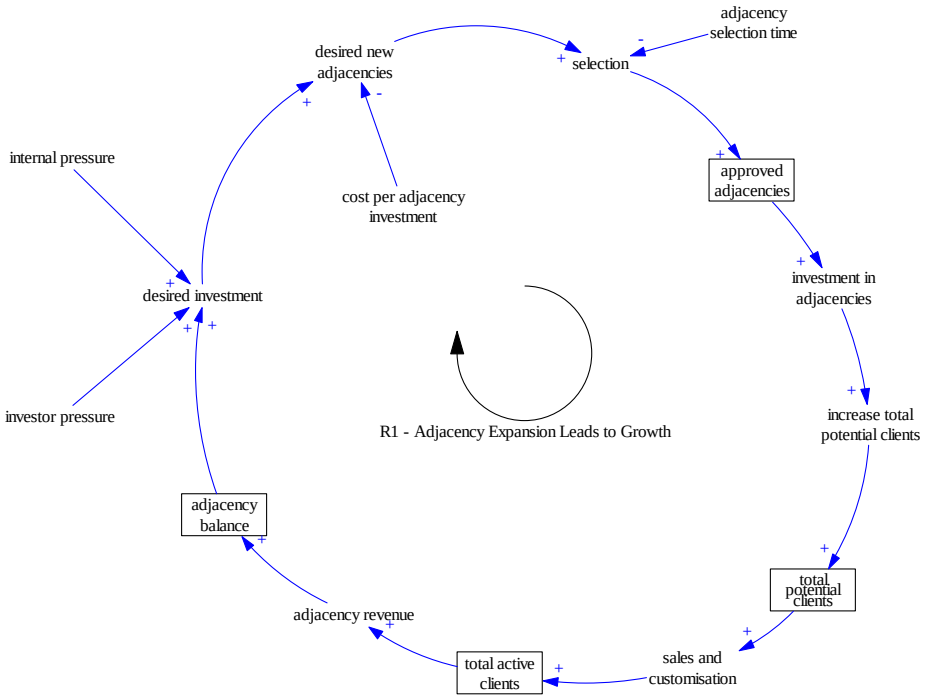

Figure 20 - Adjacency Expansion Leads to Growth

High Core Distance

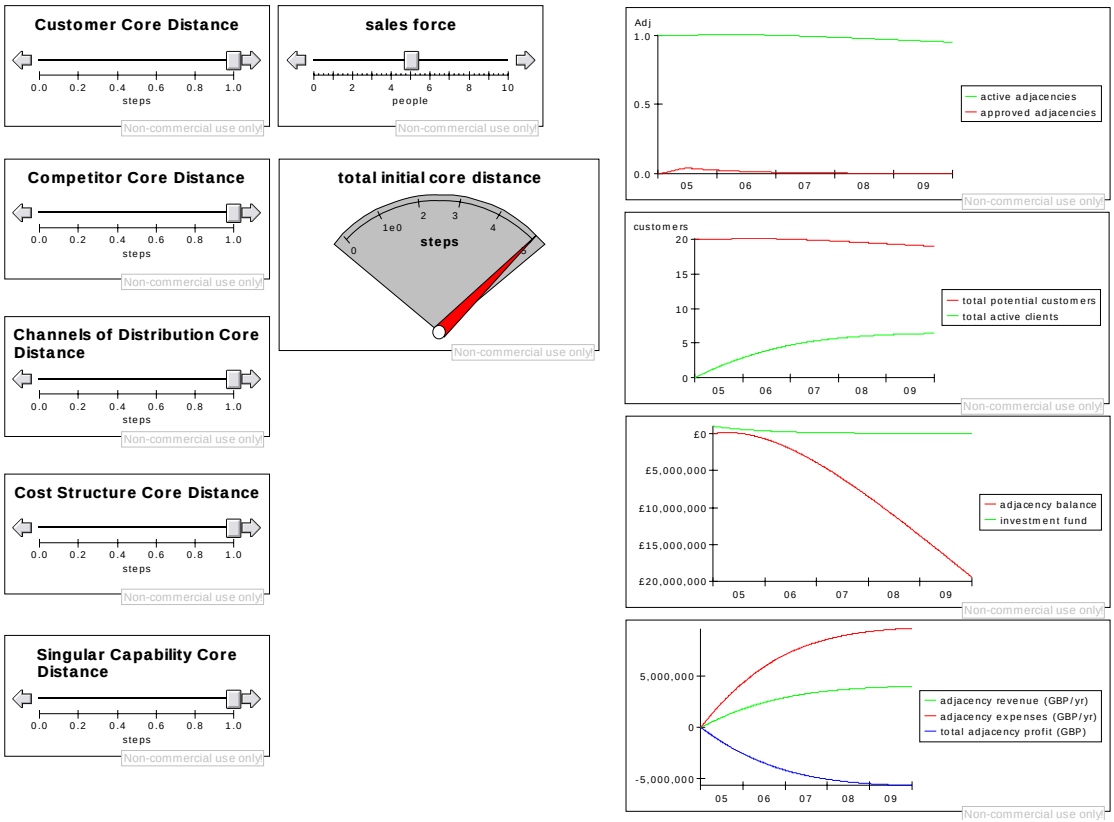

Figure 21 - High Core Distance

With the core distance set to maximum the model shows that a company can not achieve profitable growth. This is caused by the combination of the loops R1:Adjacency Expansion Leads to Growth and B1:Core Distance Impedes Growth in Fig. 22 below. If B1 becomes too strong, it causes R1 to reverse, leading to negative growth.

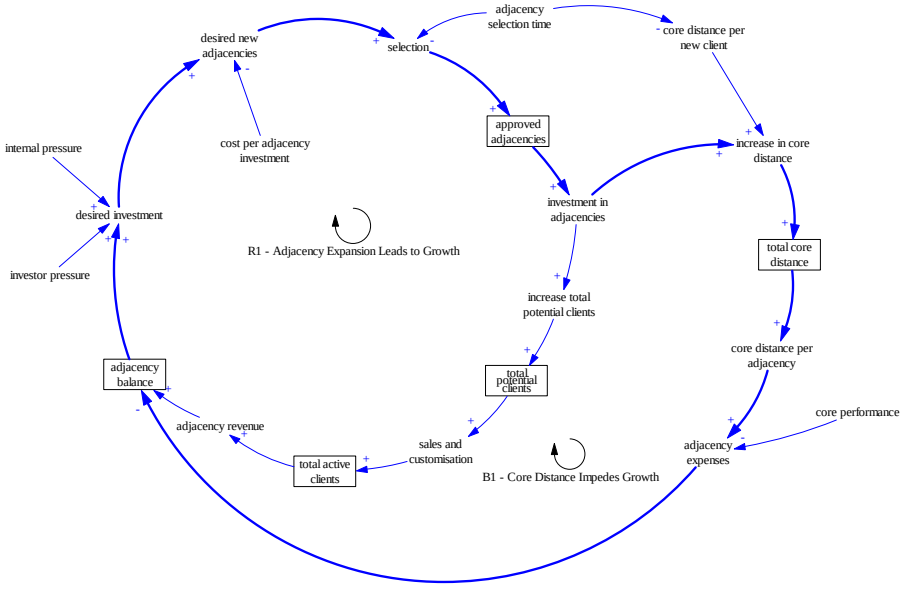

Figure 22- Core Distance Impedes Growth

Thatcham Workshop

On 28th and 29th of April the modelling team met with General Manager Peter Jones and Manager David Smy from SCA Supply Chain Services. The archetypes 'Underachievement – Distance from the core' and 'Underachievement – Repeatability' was presented along with the four archetypes depicted in section 'More 'Beyond the Core' archetypes'. The preliminary model was also presented.

The archetypes were introduced first. This gave the SCA SCS staff as soft introduction to system dynamics before presenting the much more complex adjacency expansion stock and flow model. By explicitly showing that the model reflected each of the archetypes, the SCA SCS participants understanding of the model were increased. This allowed them to immediately criticize the model and suggest enhancements.

Conclusions

We review the challenges posed in the Introduction:

1. Evaluate the usefulness of archetypes in reaching a final project definition.

The discussions with SCA Packaging UK resulted in a clear project definition. The objective of the study was agreed upon, including strategic level and the specific cases to be examined. In this respect the use of system archetypes as a tool for communication and creating discussion has proven successful.

2. Evaluate the use of system archetypes to anchor the stock-and-flow model around the main anticipated problem and policy structures.

A dynamic hypothesis is usually a written statement. An archetype used at the front of the modelling process, can serve as a dynamic hypothesis with anchoring points for the SD model. In many ways this is better than a written statement. An archetype has an assumption about the dynamics of the system built in. I.e. it has an assumption about how the system behaves and potential problems in the system. In this way an archetype can serve to anchor a stock-and-flow model around the main anticipated problems and policy structures.

3. Evaluate the archetypes ability to communicate insights and ideas to people with little knowledge in System Dynamics

The lack of detailed knowledge of System Dynamics by the customer was a potential time consuming factor. The short time span of the project made it crucial to utilize available time in the most efficient manner. The system archetypes cast from cases in Zook's book allowed the modeller and SCA Packaging UK to quickly get down to business. The archetypes helped both the modeller and the customer stay focused on the issue. This is due to the archetypes ability to clearly communicate complex issues in a clear, easy-to-understand manner. Although the archetypes do not cover the whole range of issues in Zook's book, they still showed many of the key points.

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