1998 International System Dynamics Conference

Balanced Strategies for Balanced Scorecards: The Role of System Dynamics in supporting Balanced Score Cards and Value Based Management"

Eric Wolstenholme,
Professor of Business Learning, Leeds Business School and Director COGNITUS

Abstract

This paper will describe the potential of system dynamics models to support balanced score card and value based management initiatives in business.

Balanced scorecards are being used by an increasingly large range of companies to develop performance measurement thinking outside the pure finance area. They have created an awareness of the need for companies to balance measures of financial performance with measures of internal processes, customers and human resources. In particular, to recognise the intangible assets of a company such as intellectual capital and competency.

These methods represent a first step in holistic thinking by recognising the existence and importance of the full breath of operational aspects of business and the idea of measuring future potential. Additionally, users of the approach are increasingly recognising another systems concept - that such performance measures are interdependent.

In systems terms, performance measurement is an important, but limited application of systems thinking representing only one aspect of the feedback cycle. System dynamics has an important role to play in extending this trend in performance measurements to a full systems approach.

This paper will describe the way in which system dynamics is being used to support the design, testing and use of balanced score cards, involving value based measurements, centered on the use of models to relate today’s investment and strategy decisions to tomorrow’s scorecards.

The paper will also comment on this work as an excellent example of the way in which the use of system dynamics in business can be rapidly accelerated by integrating it into current semi-systemic management initiatives.

Introduction - New Wave Management Thinking

Many managers are recognising that there is an urgent need to gain better perspectives of the operations and performance of their companies and numerous ideas to facilitate improved understanding of complex organisations are being developed. Traditional business school disciplines are being rewritten and re-grouped into a new wave of management thinking. Recently defined topics include: strategic management, total quality management, business process re engineering, value based management, knowledge management, balanced score cards, intellectual capital, competence management, brand management, change management, financial engineering and business learning.

Whilst being very welcome these recent approaches to management are severely lacking in tools and techniques to aid their development and implementation and are being pursued independently in many organisations.

The common thread of all these approaches is that they try to take a new perspective on organisational activities and, whilst no one approach captures the whole management picture, each tries to link important elements of management across organisations and to emphasise a future perspective. In other words each, to differing degrees, takes a step towards a systems view of management. Additionally, each recognises in its own way the concept of value. Value is an elusive term in management, but is increasingly being defined as future shareholder value and is being established as a key, global performance indicator of success.

This paper will focus on the role of system dynamics in support of balanced scorecards and value based management and also on the role of these methods in promoting system dynamics.

Balanced Scorecards and Value Based Management

Origins

The concept of balanced scorecards arose as a result of the disappointing results arising from many well intended initiatives associated with TQM, JIT, ABC and BPR. The missing link (Kaplan and Norton, 1994) was the fact that

these initiatives were often not measured against financial performance and economic indicators, nor linked to the strategy of organisations. Breakthroughs in performance require major change and that includes changes in the measurement and measurement systems used by organisations. More importantly is the idea that competitive, technological and capability-driven futures cannot be accomplished merely by monitoring and controlling financial measures of past performance, but need to be linked to visions and perceptions of the future. This is the link with value based management.

Value based management is a method of exploring ways of measuring and improving the performance of a company in terms of future free cash flow across all its sectors (Dauphinais and Price, 1998; Price Waterhouse Cost Management Team, 1997).

A number of methodologies are being developed for balanced score card. These are supported by heavy data mining exercises and by system integration implementations. Most implementations generally aim to derive and apply measures in four, balanced categories. These are internal processes, customers, learning/growth and finance. When value based management is linked with balanced scorecards, future value becomes a key performance measure (See Figure 1).

There are two significant concepts associated with balanced scorecards and value based management which create a link with system thinking and dynamics. These are the idea of thinking about the whole organisation, not just one aspect of it and the idea of thinking of the future. These will be discussed further in turn.

Thinking Across the Organisation

Thinking across the organisation means effectively thinking more broadly than financial performance and recognising each individual operation and asset of the organisation. There is a need to broaden out performance measurement to include measures other than finance, particularly to cover a company's intangible and intellectual assets, such as such as high quality products and services skilled employees, responsive internal processes and loyal customers. It is very possible, for example, for a company to look good in financial terms and yet be very poor in terms of intellectual capacity.

This spatial broadening of measurement across the corporation is effectively a first, important step in developing a systems perspective of an organisation which, by itself, has important possibilities. It has the potential to bring more

recognition of non-financial parts of companies to the boardroom and, in particular, to give greater recognition at this level to people assets. It also forces thinking on the physics and operations perspectives of organisations in general, rather than their financial equivalents. This, in turn, opens up the potential for management to structure thinking about all processes in the way they think about financial processes. That is, as balance sheet items. It is possible to think of balance sheets composed of stocks of intellectual capital, customers, products (and those in the pipe line).

Thinking about the Future of the Organisation

Apart from thinking across all operations, there is a need to think about future performance, rather than past achievements. Again, it is possible for a company to look historically healthy, whilst having little potential for the future. There is therefore a need to have a shift in emphasis in time as well as in space. Future thinking is being reflected in current work in value based management, where performance measurement, albeit in financial terms, is being captured in the discounted value of future free cash flow. This type of measurement provides an interesting view of a company and, by the very nature of discounting, applies a further systemic concept. That of weighting the short term, non-linearly, against the long term.

Practical Problems in Applying BSC and VBM

There are a number of practical problems in using the forgoing ideas which are only too familiar to system dynamics (Forrester, 1994; Wolstenholme 1990). Firstly, performance measurement is only one element of a based feedback control cycle and so how can it be possible to develop balance score cards in isolation from developing and testing the policies and strategies which create the measurements. Secondly, BSC and VBM thinking is only just recognising that there are interconnections and trade offs between alternative measurements. For example, downsizing can give excellent financial results today, but create severe medium term shortages of, say, intellectual capital. Thirdly, how can futures be designed without tools capable of testing the behaviour and tradeoffs between alternative performance measures, strategies and futures? Forthly, what types of balanced strategies are required today to ensure balance scorecards tomorrow?

BSC, VBM and Feedback

BSC and VBM provide a natural and inviting home for applications of system dynamics and system dynamics has long had the tools to study complete

feedback cycles. The lever by which to connect system dynamics to BSC is hence through building up the concept of feedback control from performance measurement. Figure 2 shows such a cycle, which has been termed the value cycle.

Here, the purpose of balanced measurement across all operations is seen to provides the knowledge on which to create future strategic vision. The main route to implementation of the vision is by the definition of strategies and (re)investment of money to the operations, which it is hoped will eventually create future performance, which will, in turn, be successful enough to provide the means of reinforcing further growth. The balanced score card concept allows a better audit of where a company is and might evolve to, but still leaves a large gap in this cycle represented by the shaded areas in Figure 2. This is concerned with how information today can be used to create the desired performance of tomorrow.

Designing Balanced Policies for Balanced Scorecards

Figure 2 provides a clear role for system dynamics models to fill the gap and allow testing of strategies across all operations, over time, allowing for the enormously differing time factors associated with each operation. In order to link directly with, but to extend balanced score card and value based management thinking, models have been developed with sectors to reflect the components of balanced score card thinking. Figure 3 shows the outline of such a model reflecting, not only physical, but also soft processes and their inter connectivity. Of particular interest here is the knowledge management concept associated with the need to link individual knowledge and learning with organisational knowledge and learning. Figure 4 shows the role of such a model in the value cycle.

Practical Problems in Applying System Dynamic

This paper so far has emphasised the needs of balanced scorecards and value based management that system dynamics can help to fulfill. However, system dynamics also has its own needs that balanced scorecards can fulfill. Balanced Scorecards and Value Based Management are gaining extensive use because they relate to and satisfy specific management needs, namely comprehensive performance measurement and future company design. System Dynamics on the other hand suffers from the breadth of its own systemicity and it is not easy for managers to relate their own activities to it. By using system dynamics within other methodologies, to support and extend them, rather than to replace them, its benefits can be more easily unfolded (Wolstenholme,1997).

Linking BSC and System Dynamics Methodologies in Practice

Figure 5 shows a diagram of the steps in a typical application of the balanced scorecard methodology. The general approach is to define the overall vision then to work through perspectives, goals, critical success factors and to move towards defining and testing key measures within each perspective; in this case defined as financial, customer, internal processes, development and human resources. The steps are essentially linear and much of the process towards choice of measures evolves subjectively. There is often a need to severely restrict the number of measures in each perspective and to give careful thought to overlaps.

The scope to apply a system dynamics approach lies in three areas.

The first is to use a very generic model in the visioning stage across all perspectives, to provide some insights into the nature of the processes in each perspective, the ways in which they are/will be operated, the time scales required to influence measures and the interactions between perspectives. The second is to create specific sub models within each perspective which will support within-perspective thinking. The third is to create a specific high level model again across all perspectives to assess the magnitude of the trade-offs in performance measures and hence shed some light on the most significant measures. System Dynamics models can allow insights to develop and lead to both the definition of alternative measures that may become more important in the future.

Conclusions

This paper suggests that system dynamics modelling has much to offer the growing field of balanced score cards and value based management. Experience to date has indicated the types of contribution likely to be most important, which revolve around the ability of system dynamics to move Balanced Scorecards and Value Based Management activities from a first step in systemic thinking to comprehensive systemic methods. It is also suggested that the process will provide a platform for system dynamics methods to gain greater acceptability in mainstream management thinking.

References

Kaplan R.S. and Norton D.P., 1996, *The Balanced Scorecard*, HBS Press, Boston.

Daupdinais W. and Price, C., 1998, *Straight from the CEO*, Nicolas Brearly, London.

Price Waterhouse Cost Management Team, 1997, *CFO- Architect of the Corporation's Future*. Wily, Chicester.

Forrester. J.W. (1994), *Industrial Dynamics*, Productivity Press, Cambridge, Mass.

Wolstenholme E. F. (1990) *System Enquiry - a System Dynamics Approach*, Wiley, Chichester.

Wolstenholme E. F., (1997), The Gap between System Dynamics and current Management Practice, 1997 System Dynamics Conference, Istanbul.

Figure 1

Balanced Scorecard

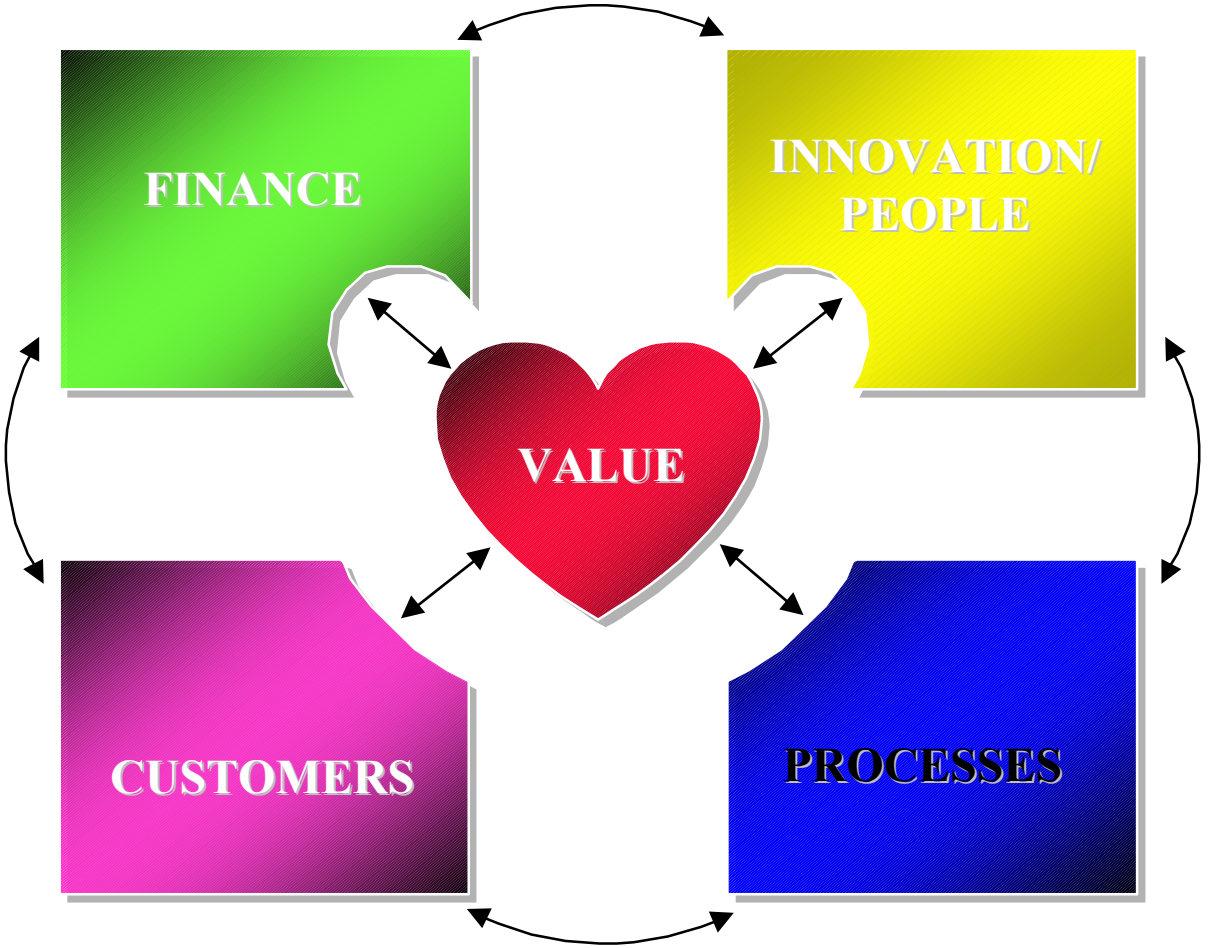


Figure 2 The Value Cycle

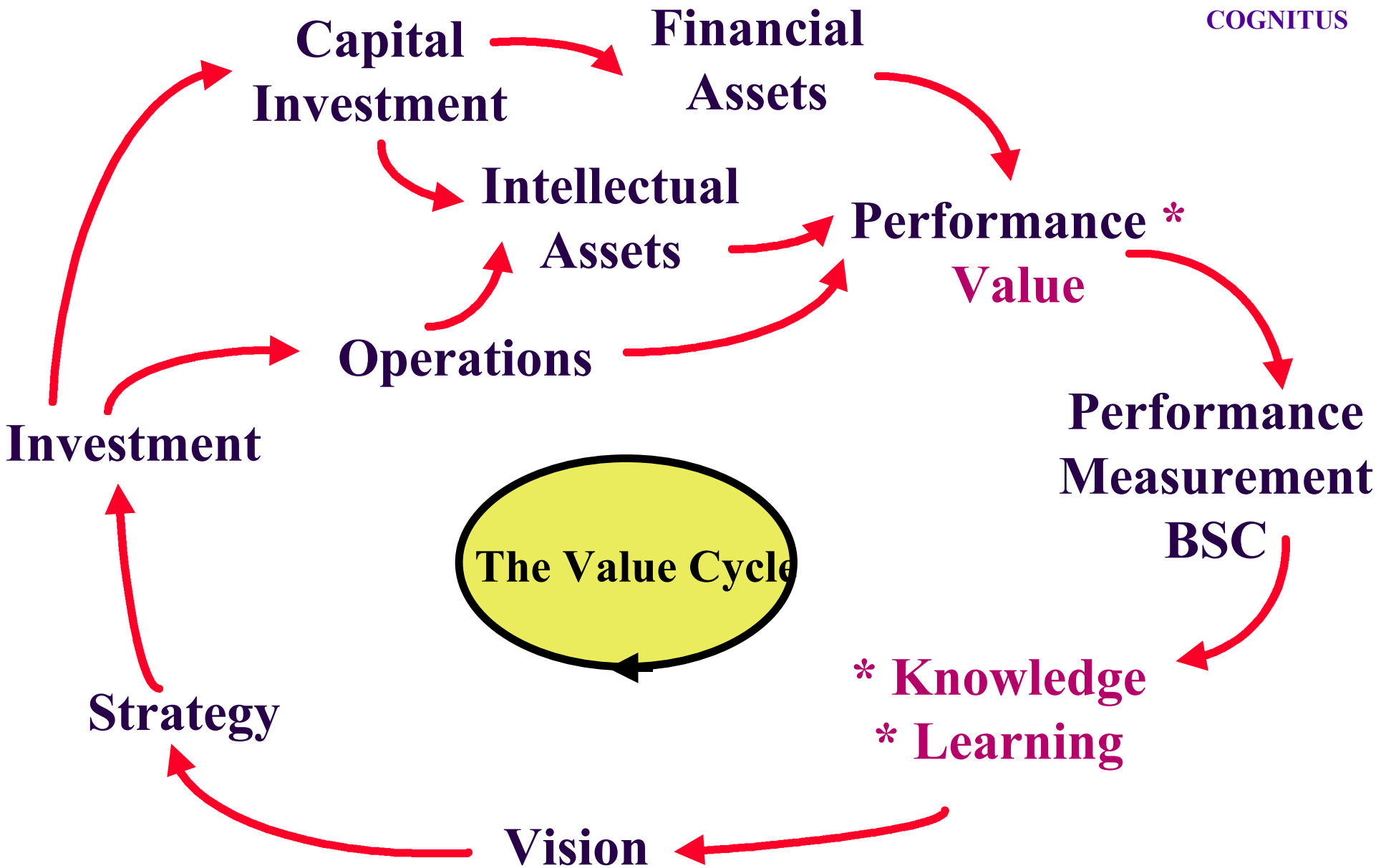
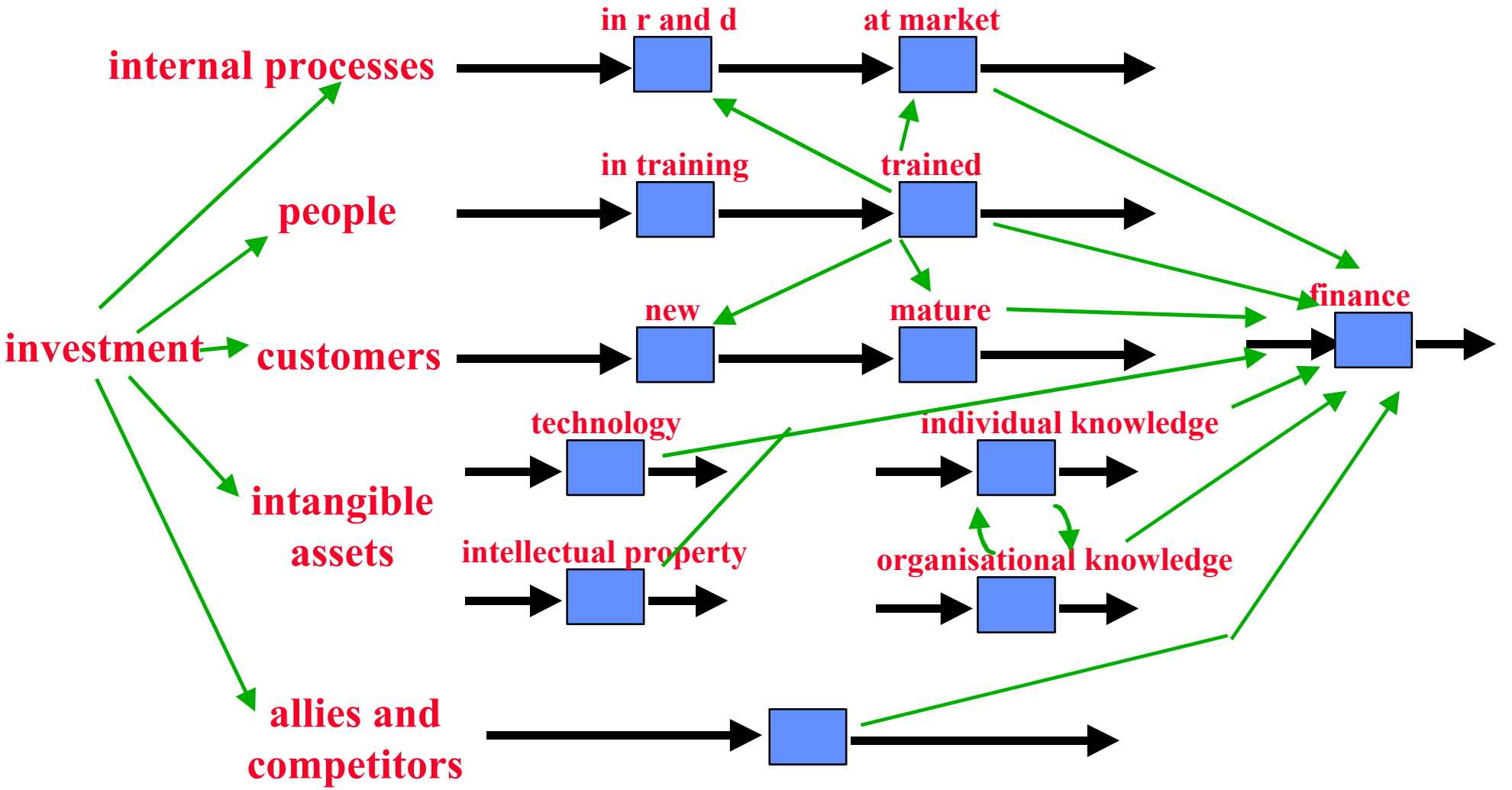


Figure 3 An Outline System Dynamics Model to Support a Balanced Scorecard Initiative



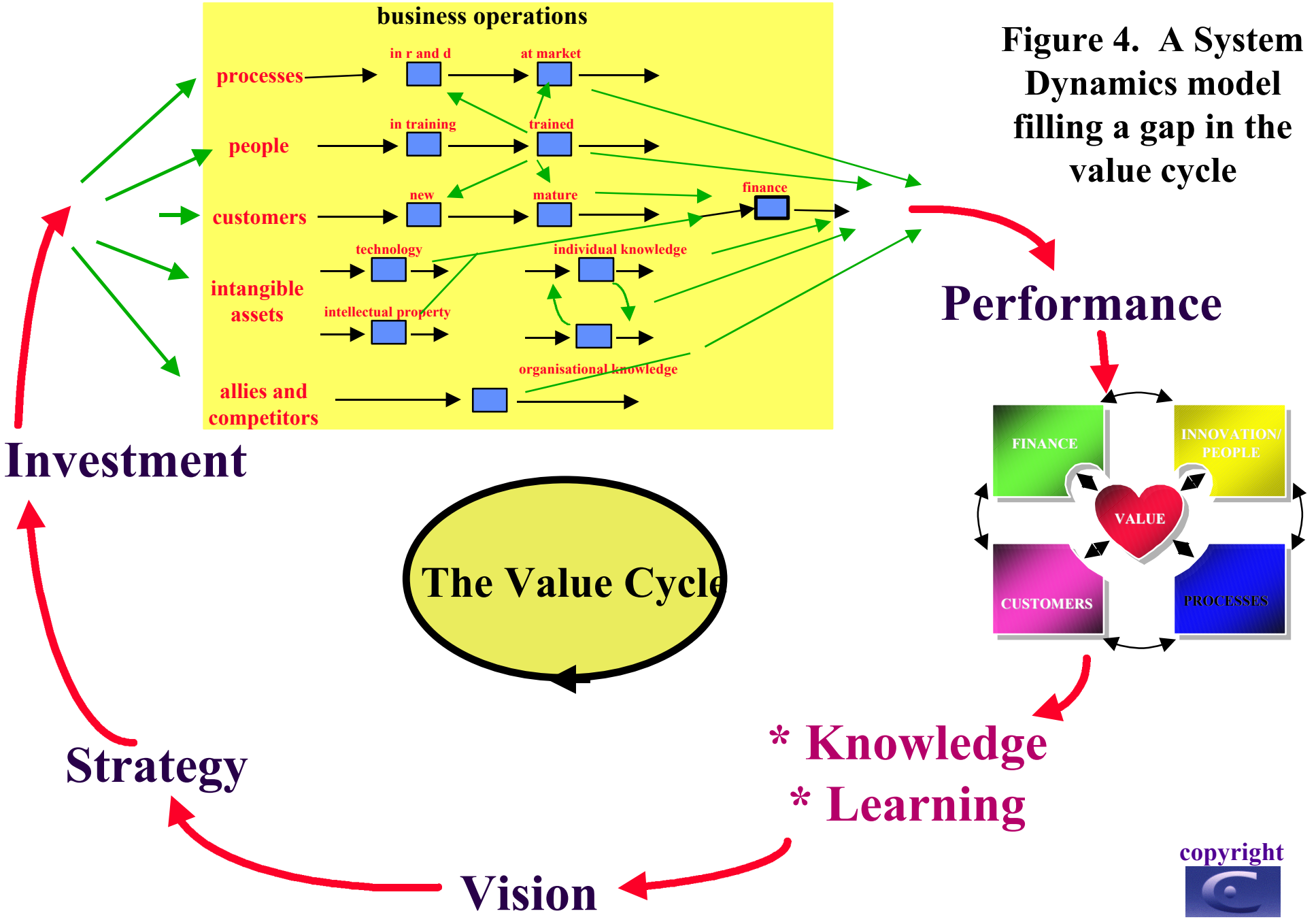


Figure 4. A System Dynamics model filling a gap in the value cycle

Figure 5. The steps involved in a balanced scorecard methodology