Creating An Excel-Based Balanced Scorecard To Measure the Performance of Colleges of Agriculture

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Introduction

This paper introduces the use of the Balanced Scorecard (BSC) approach in higher education, and specifically colleges of agriculture, for the purpose of managing strategic objectives. While originally developed by Robert Kaplan and David Norton for the private sector, the BSC has been successfully integrated into the higher education sector as well. This paper seeks to outline appropriate methods of integrating the BSC approach illustrated through examples, charts and figures focused on key objectives and measures central to colleges of agriculture. In addition, strategy maps will be introduced to show linkages of key entities from four different organizational perspectives. Greater exposure of methods and tools used to drive the strategic agenda in colleges of agriculture is a major objective of this paper.

The need for managing differently has been brought about by continued financial stress and by domestic and international pressure to improve quality, efficiency and reduce cost of delivering core services related to teaching, research, outreach and administrative activities. To respond to these pressures and to its own desire to improve, the University of Minnesota is engaged in a Strategic Positioning Initiative. This initiative is intended to help the University become one of the top three public research universities in the world within a decade. This lofty goal requires the definition, adoption, integration, tracking and management of key performance indicators used to assess progress toward strategic institutional goals. It is the intent of this paper to provide an overview of a structured approach that could be adapted to fit many colleges and

universities in tracking key performance indicators using a number of different perspectives.

Historically, analysis and reporting have focused on financial indicators as a means to assessing overall performance. Generally these financial measures report on outcomes also know as lagging indicators. This after-the-fact approach does not communicate the real drivers of future performance. What is needed is to define and manage indicators that show value through investments in students, faculty, staff, technology and innovation. To address these issues the BSC was developed by Kaplan and Norton to help overcome limitations of managing only with financial indicators. This broader perspective flushes out leading indicators that can be managed through strategic objectives tied to strategic initiatives used to drive improved performance.

What are Balanced Scorecards

Balanced Scorecards were created by Kaplan and Norton in the early 1990's to describe how intangible assets such as human capital could be transformed or realigned through internal business processes and knowledge of customer/stakeholder needs to accomplish strategic objectives. In terms of a working diagram, Learning (innovation) and Growth is visualized as the base of a pyramid, which is translated through Internal Business Processes by moving toward the top of the pyramid, through Knowledge of the Customer and finally to the key strategic objectives at the top of the pyramid. Figure 1.0 shows an example of a generic *Balanced Scorecard.*

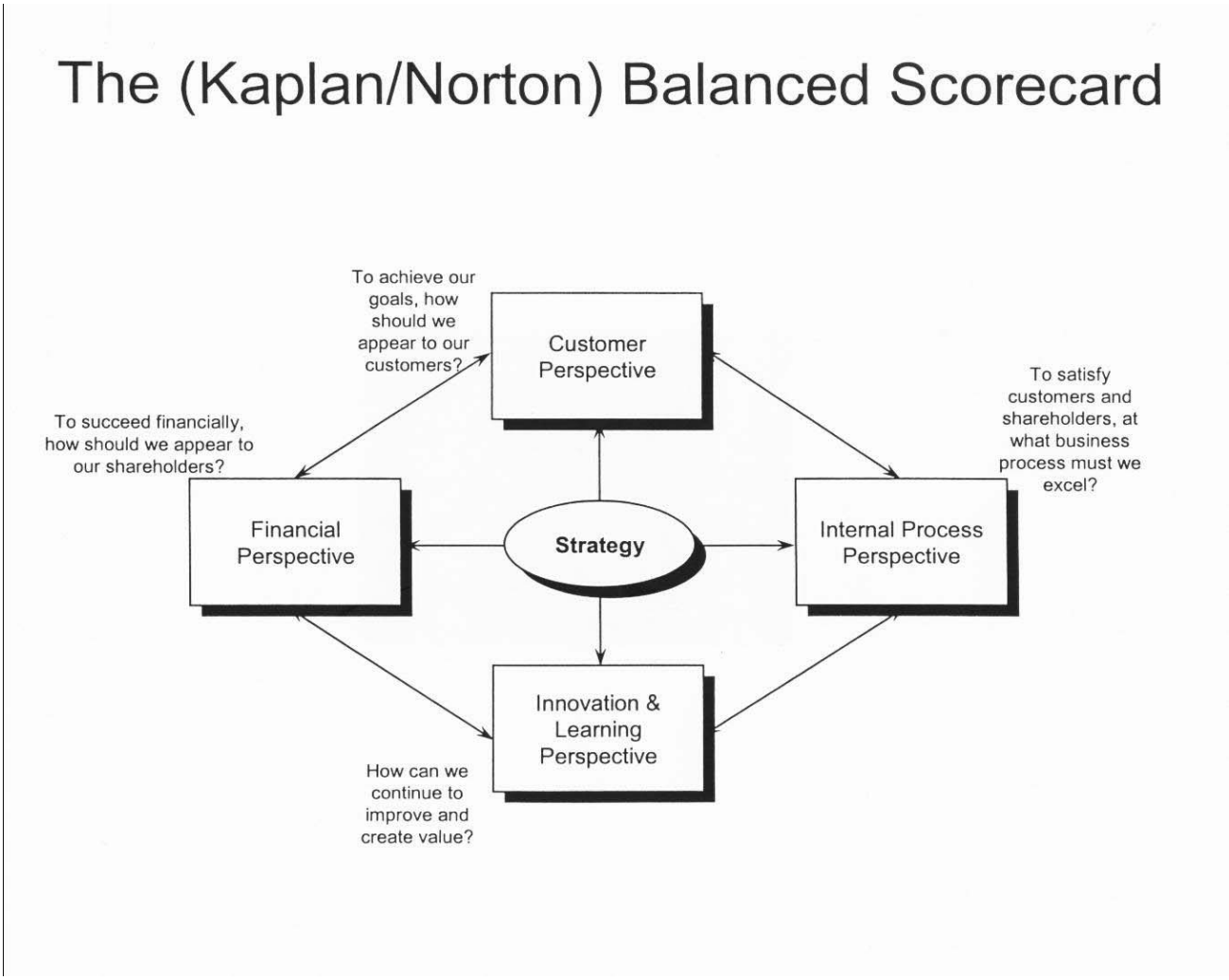

Figure 1.0 Balanced Scorecard

(Lassiter, B. 2005 p. 14)

Balanced Scorecard is related to quality improvement programs such as Malcolm Baldrige and Six Sigma. The Baldrige framework requires that certain programs be in existence to measure outcome. The Baldrige award itself requires elaborate self-study to determine how an organization is positioned to attain quality in its products and services and in terms of its knowledge of customer requirements. Six Sigma focuses on the identification of "defects" and development of internal processes to minimize defects. Attainment of Six Sigma performance is the allowance of only one defect in over a

million opportunities. Most organizations operate at a level of three sigma or below. Improvement of internal processes results in better quality and low cost. It should be noted that internal processes are one level in a Balanced Scorecard. In terms of an analogy, quality experts suggest that "Six Sigma teaches people how to fish, whereas the Balanced Scorecard teaches them where to fish."(Kaplan and Norton, 2006 p. 282).

Balanced Scorecard has been widely adopted by US companies and nonprofit organizations. The promise of transforming intangible assets into strategic objectives has been fulfilled in many of these instances.

Several modifications can be made to the Balanced Scorecard framework when adapting it to nonprofit and service organizations. In the same manner in which Six Sigma must be adapted from manufacturing to service environments, the Balanced Scorecard diagram must be modified to capture the essence of strategic business elements to accomplish organizational goals. Some of the modifications include: the replacement of financial objectives with stakeholder needs or overall mission statements. The US Army uses an overall mission of preparedness of forces as the highest step in the Balanced Scorecard with stakeholder needs just below it. Figure 1.1 shows this relationship among levels.

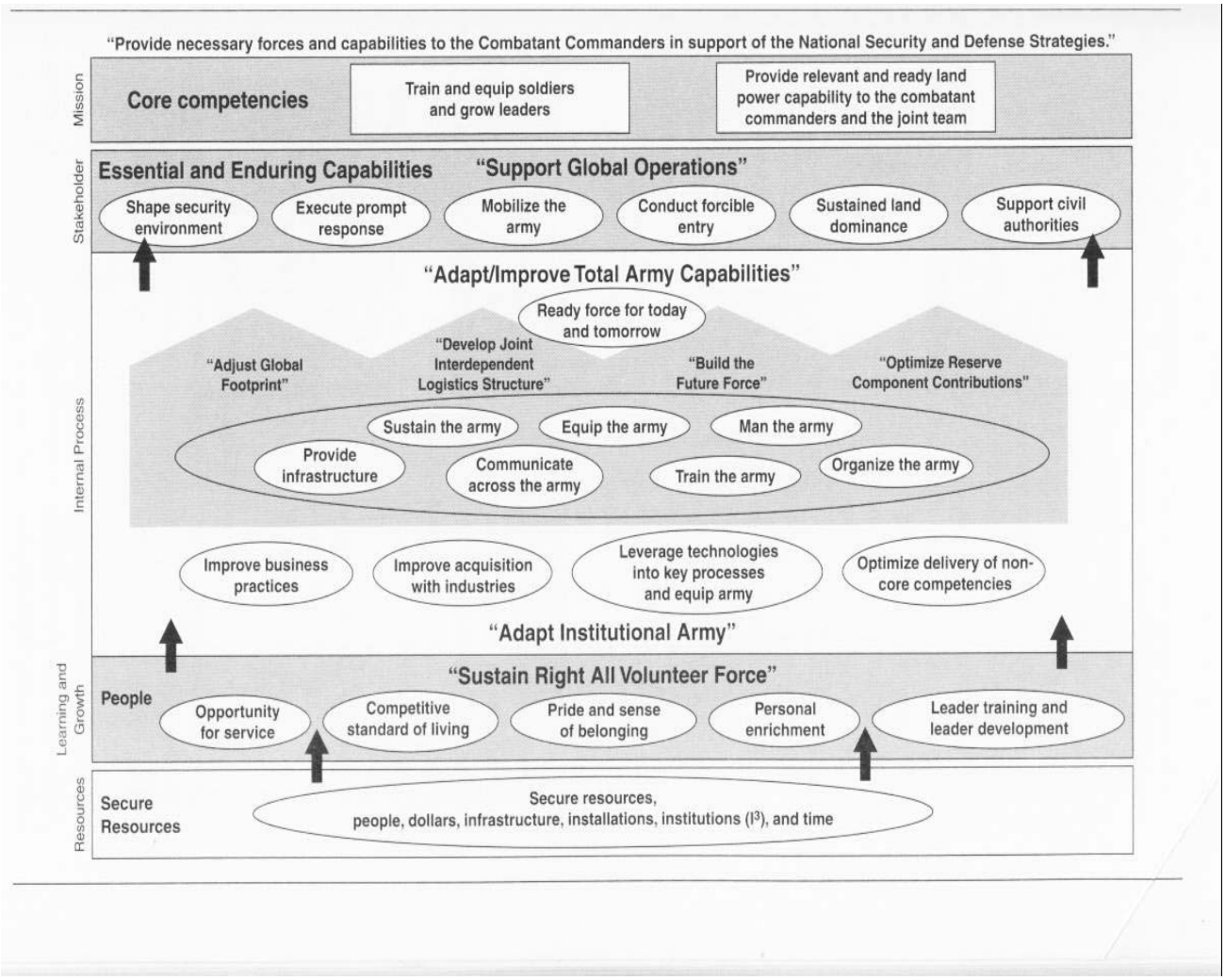

Figure 1.1 US Army Scorecard

(Kaplan and Norton, 2006 p 175)

Another modification in this scorecard is the addition of resources at a level below learning and growth. Other nonprofit organizations such as the Red Cross use similar diagrams.

An important aspect of scorecards in large organizations is the issue of alignment of strategic objectives among strategic business units or levels in a organizations. This process of alignment is accomplished by cascading balanced scorecard levels where each level is aligned to a higher and lower level of the organization. "Cascading " can be

accomplished in a top-down model (US Army) or in a bottom-up manner(FMC corp) or in a hybrid of both top to middle or vice versa - (MDS corporation). The linkage of levels insures the resonance of key objectives among levels and insures alignments and synergistic results.

Strategy maps are used to visualize the interconnections of levels in a Balanced Scorecard. An example of a Strategy Map is show in Figure 1.2.

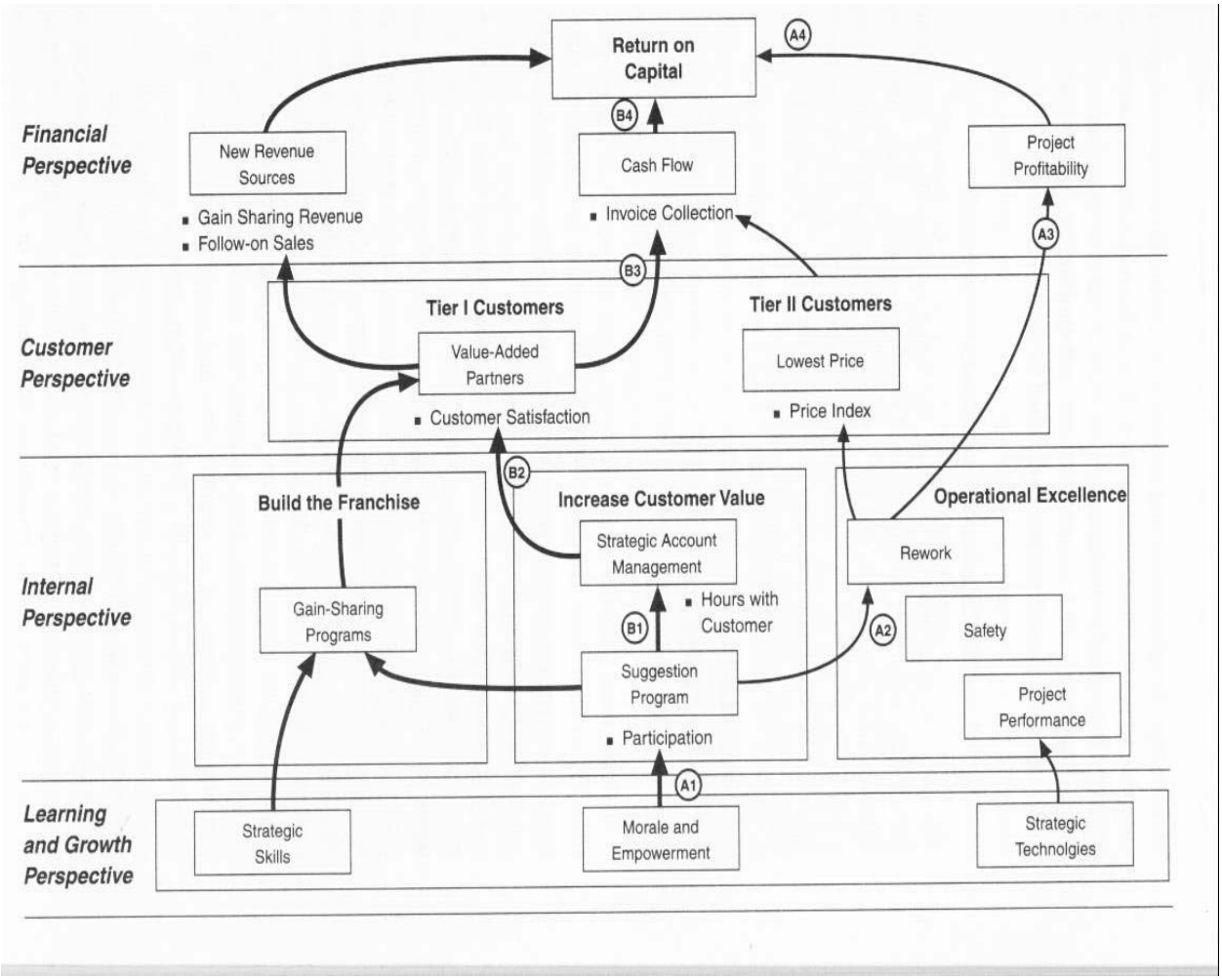

Figure 1.2 Strategy Map

(Kaplan and Norton 2001 p. 101)

Many strategy maps show the interconnections of elements within a Balanced Scorecard similar to flowcharts that show relationships between their own entities. Kaplan and Norton have authored a book on Strategy Maps titled "Strategy Maps: Converting Intangible Assets into Tangible Outcomes". Numerous examples are given as to how these maps have become guides for strategic decisions.

Application of Balanced Scorecards to Higher Education

A number of colleges and universities have begun to apply Balanced Scorecards to their respective institutions. The University of California system, the University of Akron, the University of Texas at El Paso, Wheaton College and other academic institutions have begun to develop Balanced Scorecard models of their respective institutions. This model fits higher education very well in that intangible assets are a major part of these institutions. The following Figure 2.0 shows an example of their Balanced Scorecard Models.

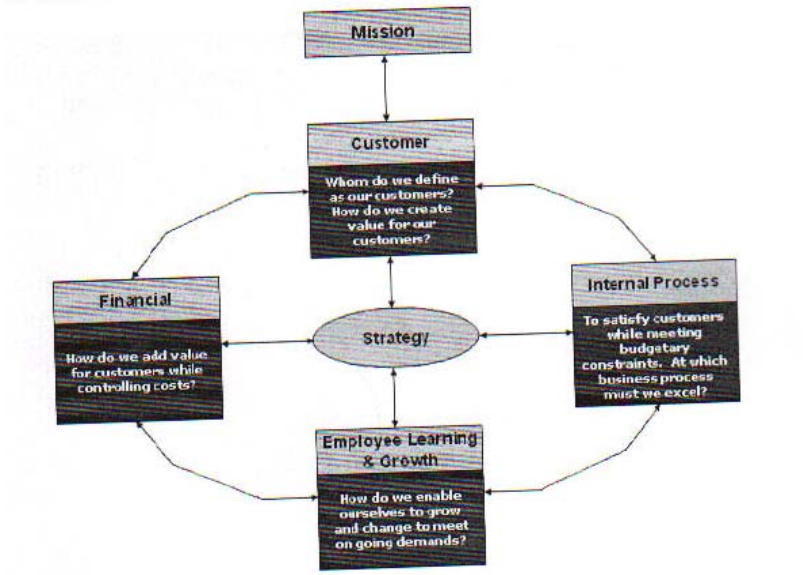

Figure 2.0 University of Texas at El Paso (UTEP) Model

(Balanced Scorecard Initiative Conference from the University of Texas at El Paso)

Perspective	Objective	Lead Measure	Lag Measure
Customer	C-1 Maintain the Transportation System	C-1 **Repair Response:** repair response action C-1 **Travel Speed:** average travel speed by facility and selected location	C-1 **High-Quality Streets:** condition of lane miles ≥90 rating
	C-2 Operate the Transportation System	C-2 **On-Time Buses:** public transit on time	C-2 **Safety:** citywide accident rate; # of high-accident locations
	C-3 Develop the Transportation System C-4 Determine the Optimal System Design	C-3 **Programs Introduced:** newly introduced programs, pilots, or program specifications	C-3 **Basic Mobility:** availability of transit C-4 **Plan Progress:** % complete on 2015 Transportation Plan
	C-5 Improve Service Quality	C-5 **Responsiveness:** % of citizen complaints and requests resolved at the CDOT level	C-5 **Commute Time:** average commute time on selected roads
	C-6 Strengthen Neighborhoods	C-6 **Issue Response:** defined situations where CDOT identifies, responds to neighborhood traffic and mobility issues	C-6 **Neighborhood-Oriented Programs:** programs implemented as a result of community-based problem-solving
Financial	F-1 Expand Noncity Funding		F-1 **Funding Leverage:** dollar value from noncity sources
	F-2 Maximize Benefit/Cost	F-2 **Costs:** costs compared with other municipalities and private sector competition	F-2 **New Funding Sources:** dollar value from sources not previously available
Internal Process	I-1 Gain Infrastructure Capacity	I-1 **Capital Investment:** $ allocated to capital projects in targeted areas	I-1 **Capacity Ratios:** incremental capacity build vs. required by 2015 Plan
	I-2 Secure Funding/Service Partners	I-2 **Leverage Funding/Service Partners:** new funding/resource partners identified	I-2 **# of Partners:** number of partners
	I-3 Improve Productivity	I-3 **Cost per Unit:** cost per unit I-3 **Competitive Sourcing:** % of budget bid I-3 **Problem Identification:** source and action	I-3 **Street Maintenance Cost:** cost/lane mile I-3 **Transit Passenger Cost:** cost/passenger
	I-4 Increase Positive Contacts with Community	I-4 **Customer Communications:** #, type, frequency	I-4 **Customer Surveys:** survey results concerning service quality
Learning and Growth	L-1 Enhance Automated Information Systems	L-1 **IT Infrastructure:** complete relational database across CDOT	L-1 **Information Access:** strategic information available vs. user requirements
	L-2 Enhance "Field" Technology		L-2 **Information Tools:** strategic tools available vs. user requirements
	L-3 Close the Skills Gap	L-3 **Skills Identified:** key skills identified in strategic functions	L-3 **Skills Transfer:** skill evidence in job
	L-4 Empower Employees	L-4 **Employee Climate Survey:** results of employee survey	L-4 **Employee Goal Alignment:** training/career development aligned with mission

Figure 2.1 City of Charlotte Department of Transportation's Balanced Scorecard

(Kaplan and Norton 2001, p. 181)

The transition from a profit business to nonprofit model involves some adaptation as seen below.

Figure 2.2 Adapting the Balanced Scorecard Framework to Nonprofit Organizations

(Kaplan and Norton 2001, p. 135)

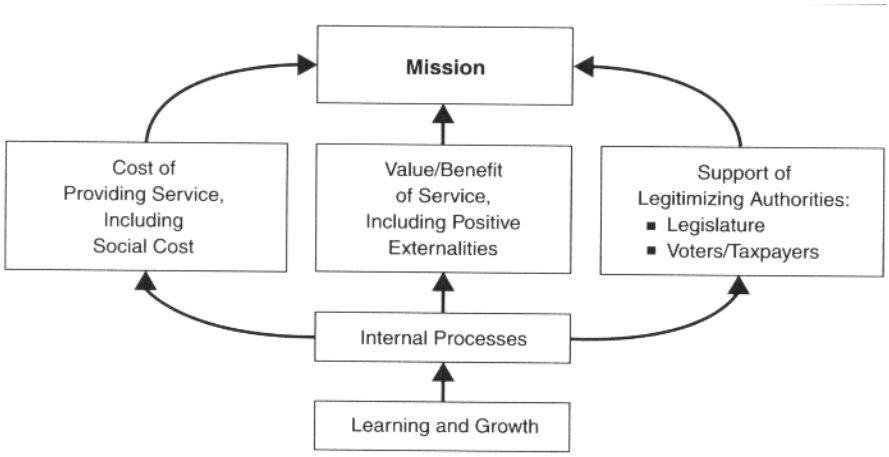

Figure 2.3 The Financial/Customer Perspectives for Public-Sector Agencies

(Kaplan and Norton 2001, p. 136)

The U.S. Army has developed extensive Balanced Scorecards. The following diagram shows one of these.

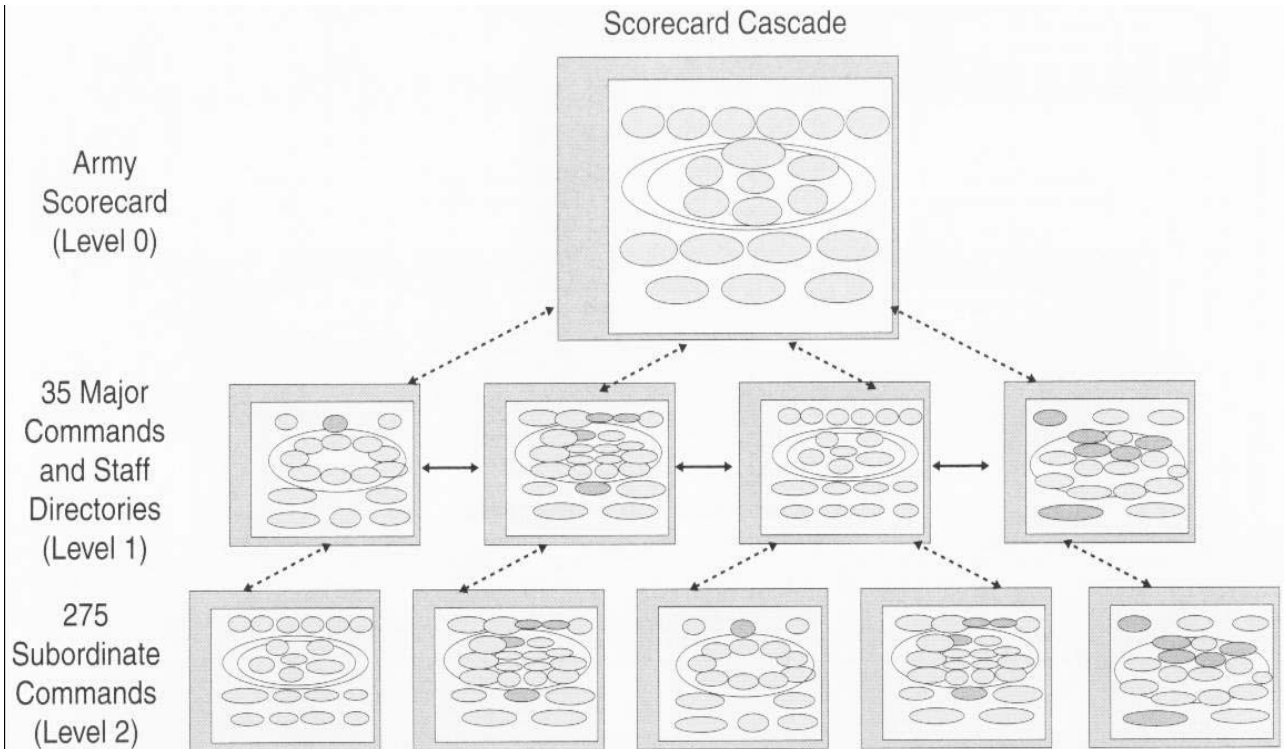

Figure 2.4 U.S. Army Balanced Scorecard/MAP

(Kaplan and Norton 2006, p. 176)

Strategic Themes	Level 1 Division President	Level 2 VP—Order Fulfillment	Level 3 Manager of Plant Operation	Level 4 Facility Manager	Level 5 Delivery Supervisor	Level 6 Terminal Coordinator	Level 7 Motor Vehicle Driver
Financial Reward our shareholders by providing a long-term return which exceeds our peers.	ROCE (%) Cash Flow ($mm) **Integrated Cost ($mm)** Integrated Income ($mm)	**LOB Integrated Cost ($mm)** Net Integrated Income ($mm)	Inventory Value ($mm) **Transformation Cost ($mm)**	Inventory Carrying Cost **Line 44 Cents per Gallon** Formulation Giveaway ($m)	**Line 25 Cents per Gallon** Backhaul ($)	**Line 2 Cents per Gallon** Unavailable Hours Backhauls Savings	**Line 24 Cents per Gallon** ▪ Idle Time ▪ Out-of-Route Miles ▪ Miles per Gallon
Customer Provide value-added business solutions to our customers and channel partners.	Market Share—Finished **Percent Perfect Orders** Distributor Survey Develop/Implement Customer Survey	**Percent Perfect Orders** Distributor Survey Develop/Implement Customer Survey	**Percent Perfect Orders**	**Percent Perfect Orders** Service Failures of Strategic Product Lines	**% On-Time Delivery** Develop Market Information Survey	**% On-Time Delivery** ▪ Empty Drums Returned	**% On-Time Delivery** ▪ Returns Drums ▪ Customer Assessment
Internal Develop market-focused strategies and become operationally excellent.	**Safety Index** Environmental Index Continuous Improvement Cost Reduction ($mm) Develop/Implement Capital Plan	**Safety Index** Environmental Index Develop/Implement Standard Offering Asset Utilization Refinery Capacity (%) Network vs. Optimum (%) Inventory Accuracy	**Safety Index** Environmental Index Complexity Index Inventory Accuracy	**Days Away from Work** ▪ Hits ▪ Off-Spec Receipts ▪ Transfers to Move Excess Base Stock	▪ **Motor Vehicle Accidents** ▪ **Days Away from Work**	Complete Environmental Self-Audit ▪ **Safety Meetings Complete** ▪ **% Attendance Safety Meeting**	Accurate Reporting Repts. 731, 601, 727 ▪ **LOG Book Violations** Market Surveys
Learning and Growth Create a high-performance organization by equipping our people to succeed.	**Employee Development Plans Completed (%)** Develop/Implement/ Measure Progress of Change Program	**Employee Development Plans Completed (%)** Develop/Implement Marketing Comp. Plan, Product Management Plan, Distribution/Logistics Comp. Plan	**Employee Development Plans Completed (%)** Attendance	**Employee Development Plans Completed (%)** Develop Plan Climate Survey	**Employee Development Plans Completed (%)** Employees Trained ISO 9000 Certification	**Training on CCE**	**Develop Personal Improvement Plan**
	SBU SCORECARD						

Figure 2.5 Examples of Cascading Among Scorecard Levels.

(Kaplan and Norton 2001, p. 248)

Figure 2.6 The Relationship Between the Balanced Scorecard within Strategic Planning Efforts

(Kaplan and Norton 2001, p. 73)

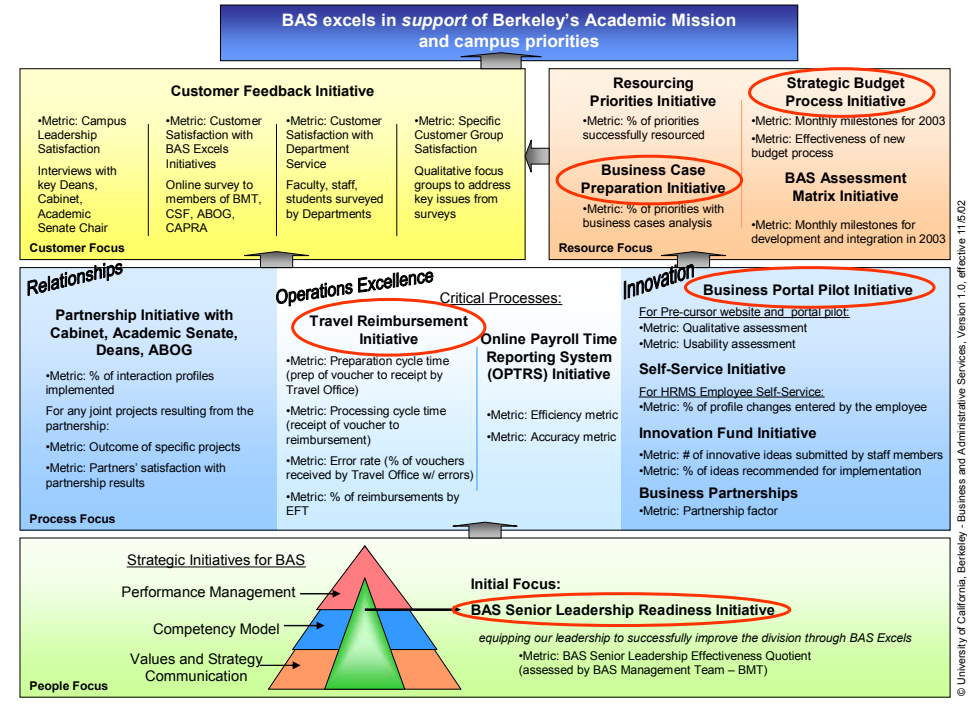

Figure 2.7 BAS Excels in Support of Berkeley's Academic Mission

(Coley 2004)

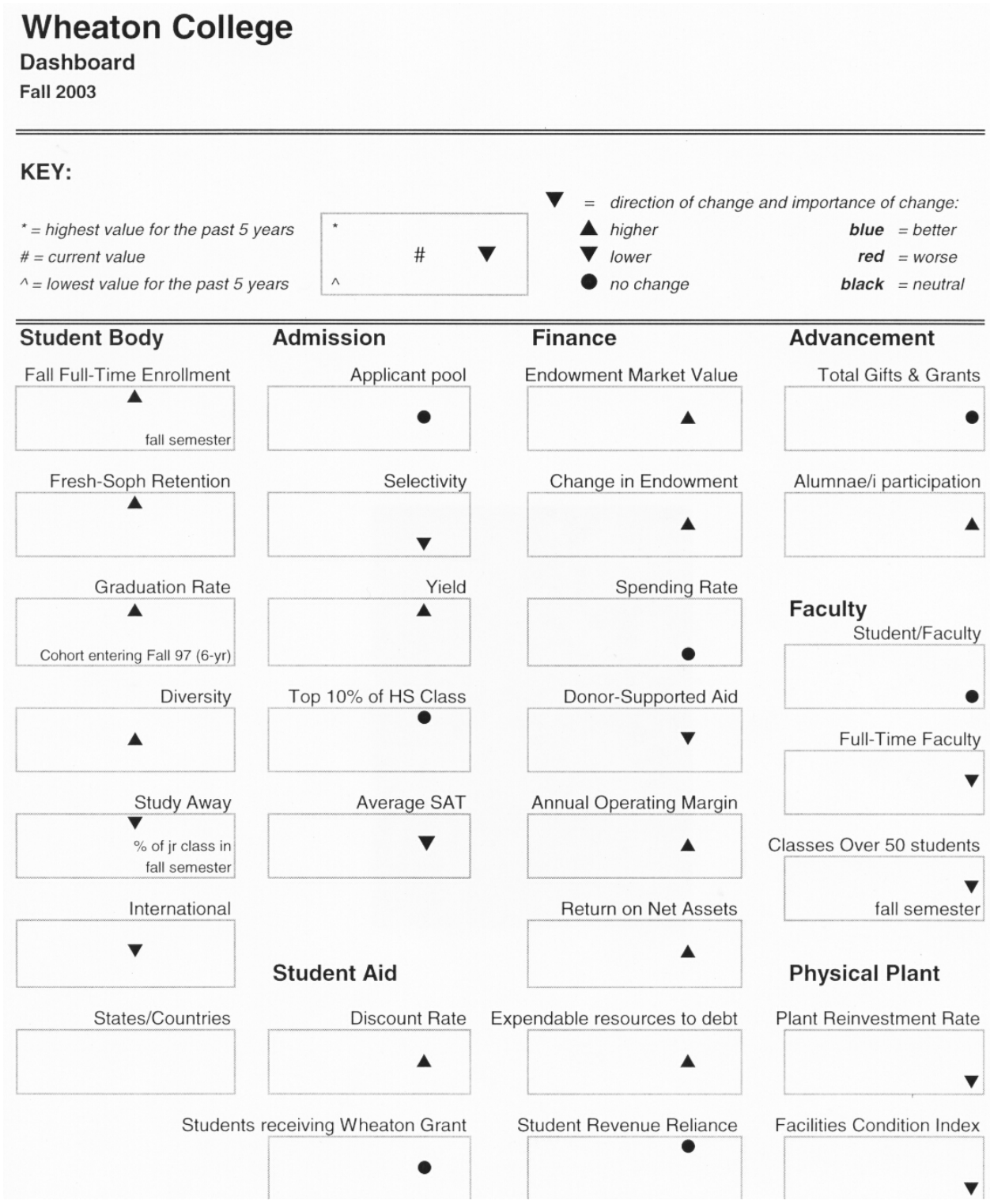

Figure 2.8 Wheaton College Dashboard Fall 2003

(Wheaton College, Fall 2003)

FINANCIAL	2005/6	Objective	
Increase of Instructional Revenue Per Student (FYE)	9.0%	Raise Tuition and increase average student credit load	To increase average credit load by 1.5 credits and keep tuition increase under 10% for the period
Net Instructional Revenue Per Student (FYE)	7.7%	To control instructional and other related costs	Goal- 6%. Net revenue equivalent per student is $3750.
Instructional State Subsidy per Student FYE	17.0	Limit reliance on state subsidy	Goal- to maintain state subsidy at 17% of O&M expenditure base
Create cash balance and or reserve	103.6	Create a 30-45 day cash reserve to meet expenses	Goal-to accelerate cash collections by use of technology to create a cash reserve for college and departments
CUSTOMER			
Faculty Satisfaction Score	92.3	Have 75% of faculty with an superior ranking of satisfaction	Goal-90% The results of a faculty survey are intended to show increases in satisfaction in response to established and new faculty programs.
Student Retention	88.0%	Have a 92% NHS 1st year retention rate	Goal-92%. To have New High School (NHS) retention after completion of 1st or Freshman year.
Course Satisfaction (SOS Forms)	79%	To have 75% of courses rated at 5.5 or above on a 7.0 scale	Goal- 85%. To have student course satisfaction increase to 5.5 or above on SOS form 4 or equivalent.
Student Satisfacation	87.7	Have 75% of students with an superior ranking of satisfaction	Goal-90%. To have student overall satisfaction with the college and its programs increase over time to reach to goal. First year goal will be 75% with a superior rating.
INTERNAL	2005/6		
Change of Majors	88.00%	To maintain student enrollment in initial majors-90-% in original major	Goal- 95%. To have students select proper major programs and reduce the % of students who switch majors late by end of sophomore year.
Classroom Scheduling	85.0%	Have 90% or more of classrooms used on a yearly basis	Goal- over 90% utilization of existing facilities due to scheduling and other efficiencies
Time to Degree	56.0%		
Courses Dropped Due to Enrollment and other circumstances	9.0%	Have 95% or more of courses listed on College catelogy offered	Goal-95%. To offer 95% of courses listed in college catalog
Student Complaints	88.0%	Less than 5% of the student population register a complaint in a	Goal- less than 5%. Student complaints listed with student services on an annual basis.
Case Management Indicator TBA			Case Management: Anticipate implementing comprehensive case management program by the second quarter 2003. Once implemented, significant monitoring will be developed.
LEARNING AND GROWTH			
Faculty and Staff Evaluations and Feedback	100%	Conducted as scheduled during the yeaer	GOAL - 97%;The process improvement implemented by Human Resources in 2002 has demonstrated improvement in the timely completion of evals for 2 qrts. Will continue to monitor to evaluate process sustainability.
Personal Goals Achieved	21%	Meeting professional development goals as listed on	GOAL - 90%; The process improvement effort for timely completion of competency evaluations has sustained goal for 3 consecutive quarters and has been moved to an on target status. Will continue to monitor to ensure continued compliance.
Leaves of absence or other enrichment opportunities	8.7	To have 90% or more of faculty and staff utilize opportunities for	Goal- to fulfill quota of faculty single semester and yearly leaves and offer staff leaves as appropriate.
Employee Satisfaction Surveys	45.0	90% or more of employees with a superior rating	GOAL - 90% No Comment
Overall Score	49.8		

Figure 2.9 Example of BSC at College or Unit Level

(Shareware from unknown source, 2005)

It should be noted that the development of balanced scorecards has been very recent. Some institutions such as Pennsylvania State University are just now developing a structure for use in this manner. Modifications to the diagram are readily apparent and different measurement devices are also used. No institution has developed a fully cascading series of Balanced Scorecards. However, the University of Texas at El Paso has made some progress in this area.

This paper will discuss the process of strategic alignment at the University of Minnesota- a work in progress- and will present an Excel spreadsheet which contains levels of a Balanced Scorecard in Beta version at the College or Strategic Business Unit Level. Discussion of the use of Balanced Scorecards in capturing synergies of combined collegiate units will be accomplished also. The new collegiate unit the College of Food, Agricultural and Natural Resource Sciences (CFANS) is the result of the merger of the College of Natural Resources with the College of Agricultural, Food and Environmental Sciences. Kaplan and Norton discuss the capturing of synergies by alignment and realignment of business units. They suggest common core values are the easiest to imbed in scorecards with the criteria of overall alignment of diverse strategic objectives unique to the strategic units being the most difficult to develop.

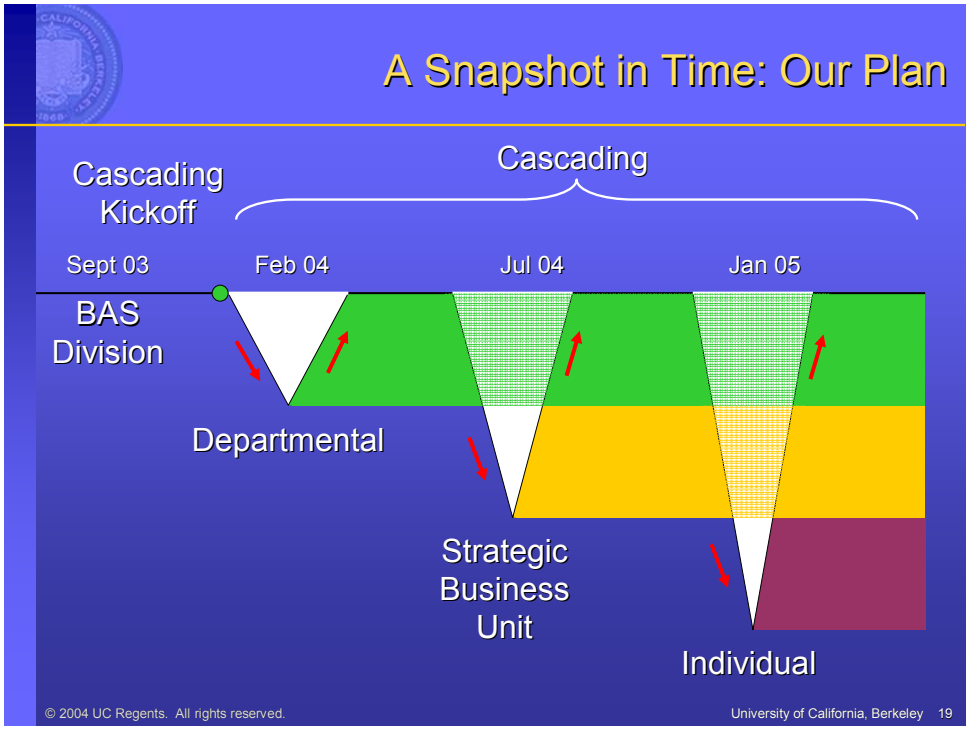

Figure 2.10 Cascading of Levels in the Balanced Scorecard

(Coley 2004)

Strategy Maps and Balanced Scorecards: Drill-down of Objectives

The interaction of Balanced Scorecards and Strategy Maps is very important to recognize. The Balanced Scorecard shows the levels in achievement of overall strategic objectives- beginning with Learning and Growth, progressing through Internal Processes to the Customer Perspective and finally overall objectives, either Mission, Stakeholder or financial, depending upon the type of institution as seen in figure 3.0 below.

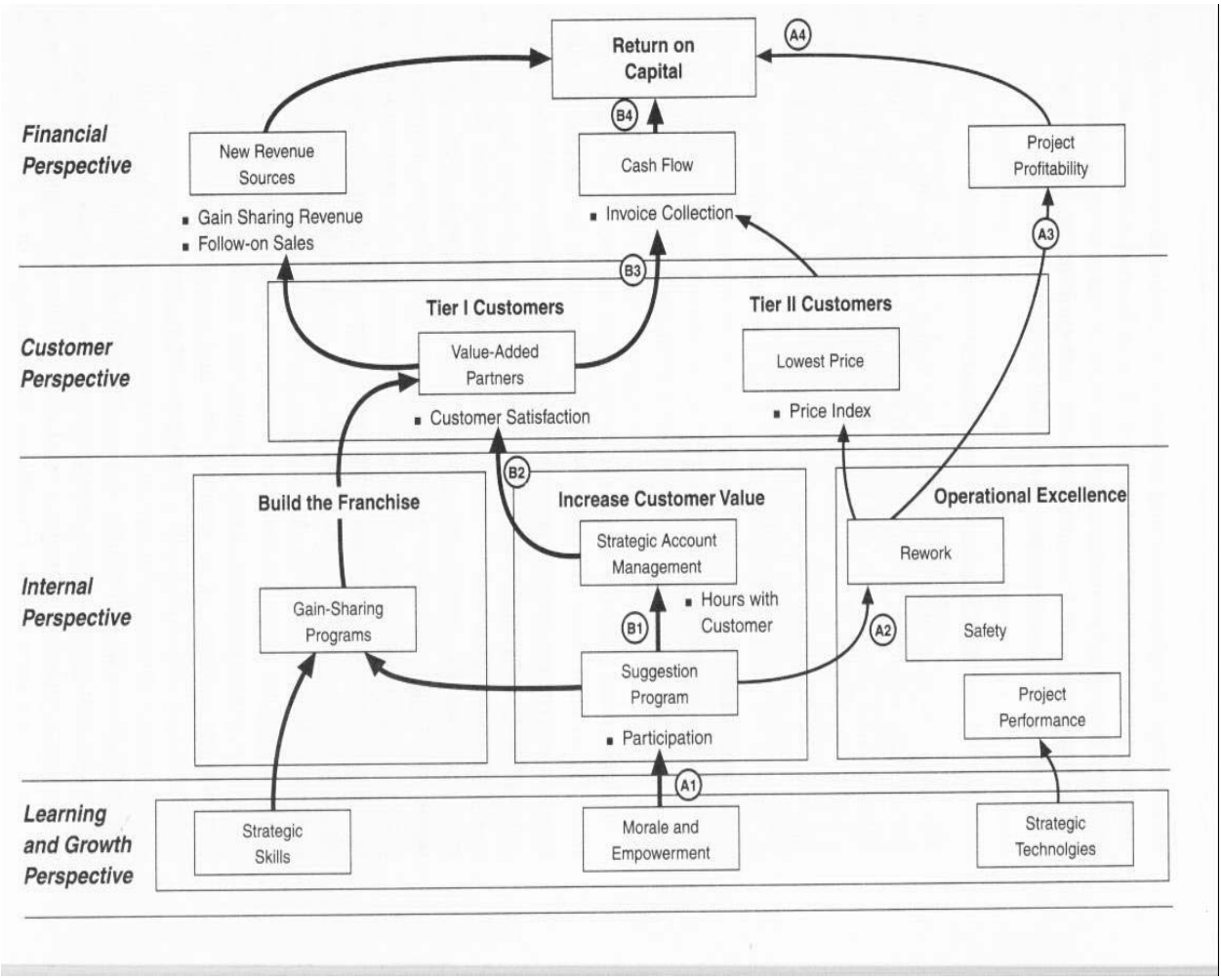

Figure 3.0 Strategy Map

(Kaplan and Norton 2001, p. 101)

The Strategy Map is more detailed and shows the specific interactions between each of the levels. Some interaction connections may skip stages and go directly to overall objectives. Knowledge of this interaction allows the strategic planner to develop programs including actions steps and tactics to foster and achieve these relationship connections.

A program called Strategy Map is available to analyze the interaction of Balanced Scorecards and Strategy Maps. Some of the output is shown later. Strategy Map allows

the user to design Vision & Mission statements, perform SWOT analysis and file a business plan for use in analysis. The drill-down of objectives is performed in a database manner. Each of the statements is indexed under goals, perspective, and other headings. Strategy Map allows the export of maps and other data.

The use of Strategy Maps assists the strategic planner in sequencing the desired programs to be used in enacting changes.

Designing a Balanced Scorecard at the College Level: First Efforts

The process of developing a Balanced Scorecard at the collegiate level involves some assumptions. First of all, the overall objectives must be transferred to this level. The goal at the University of Minnesota of becoming "one of the top three public research universities" must be recognized as a primary goal at the college level. This achievement can be measured by research grants and publication quantity and quality.

It is more difficult to measure the attainment of a quality position in other mission areas: teaching and outreach. The following spreadsheet contains some of the early thinking that is transferred to a working spreadsheet. See below figure 4.0 showing the Wheaton College Dashboard as referenced earlier.

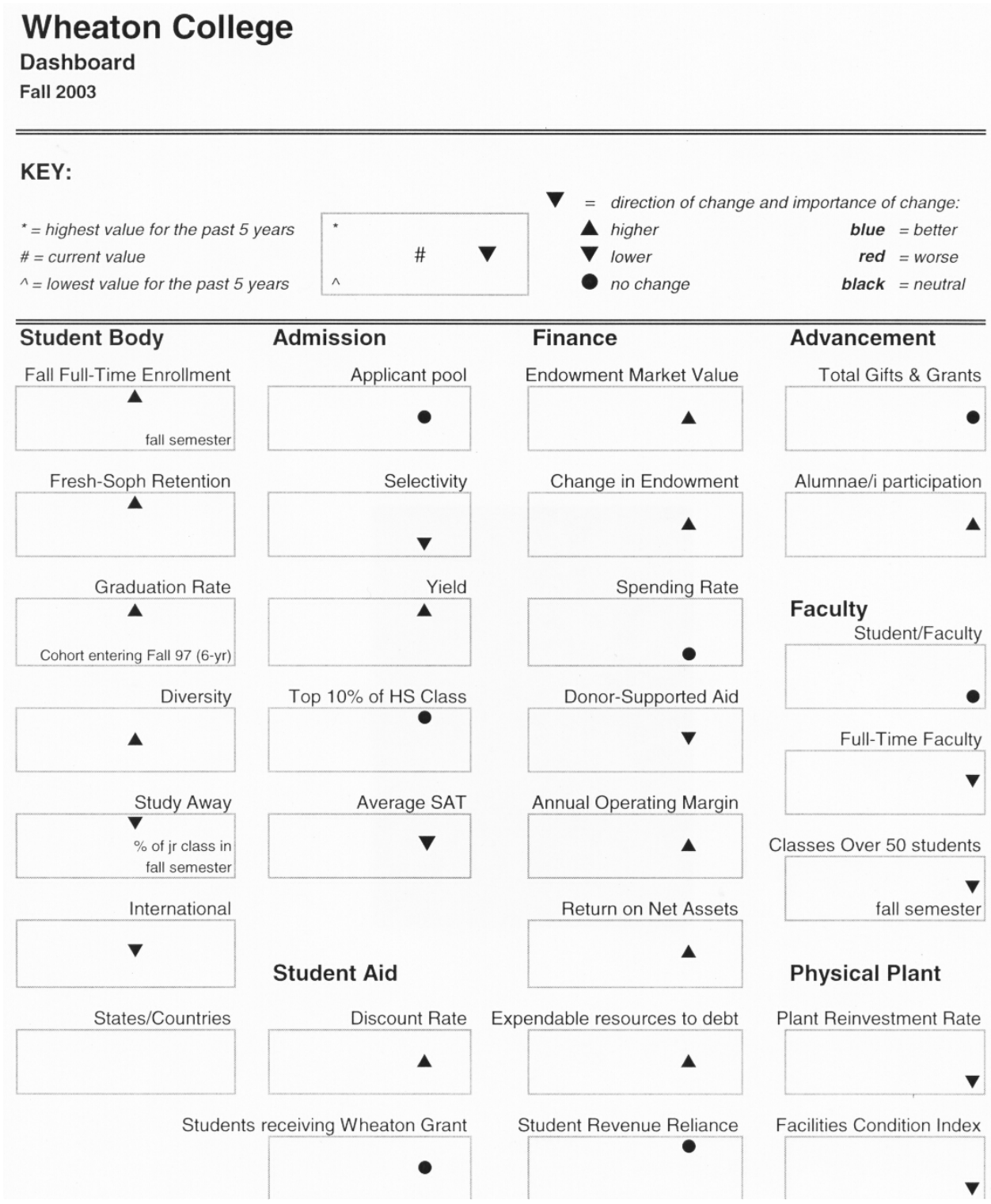

Figure 4.0 Wheaton College Dashboard Fall 2003

(Wheaton College, Fall 2003)

A further example of applying the balanced scorecard approach to higher education is illustrated by the above figure 2.9. Each of the four categories or perspectives shows aspects of the instruction mission. Each of the four quadrants includes a stretch goal, a target value and a related objective.

Summary and Conclusions

This paper describes the evolution of Balanced Scorecards to its application to nonprofit and service industries and colleges such as CFANS (a combined unit of Colleges of Agricultural, Food and Environmental Sciences with the College of Natural Resources). The use of Balanced Scorecards allows strategic planners to connect the various levels of larger, combined business units with efforts of individual faculty and staff. The data processing applications using Excel have been shown and a beta version of an Excel-based Balanced Scorecard for CFANS. This example is a beginning point and requires much work to refine and flush out further strategies related to research and outreach.

The application of Balanced Scorecards to business units is instrumental in showing progress toward strategic objectives. It should be noted that one of the most important aspects of this application process is the alignment of individuals and resources within units to create synergistic value. Once alignment of objectives is achieved, new possibilities for cooperative enterprises will appear and can be added to the basic strategy maps. The sum total of all these efforts will create an augmented value to the stakeholders at all levels in an organization with the adoption of Balanced Scorecard serving to facilitate this process.

Further research is needed in the investigation of the process of alignment and value creation. The alignment relates not only strategic objectives but to Balanced Scorecards that cascade across multiple organizational units. The authors plan to proceed with this effort in future work.

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