

## CHAPTER 2

### Literature Review

#### 2.1 Introduction

Performance management is a set of processes that help businesses discover efficient use of their business units, financial, human and material resources. Its focus is on creating methodical and predictable ways to improve business results or performance across organization. Enterprise performance management (EPM) is also known as strategic performance management (SPM), business performance management (BPM), or corporate performance management (CPM). A more generic term, enterprise performance management (EPM), has been used throughout in this research work. The system used for deployment and administration of enterprise performance management is known as enterprise performance management system (EPMS). Enterprise performance management system helps organizations to achieve their strategic goals.

The EPMS uses performance measures also known as key performance indicators (KPIs), dimensions, and perspectives to measure the performance of an organization. The objective of performance measurement has changed over the past few decades. In today's globalized competitive market, traditional performance measures based only on financial or productivity analysis are no longer appropriate and effective. Alternative performance management systems have thus been proposed by many authors and researchers, which incorporate variety of performance measures/key performance indicators (KPIs) in addition to financial or productivity measures.

## **2.2 Concept of Enterprise Performance Management**

Some form of performance management systems (PMS) have existed since the beginning organizations came into being. Initially, the focus of measurement was on financial aspects. Then came next generation, where the performance was measured on a particular perspective but they lacked in terms of their comprehensiveness in measuring performance of an enterprise. According to Drucker (1964), two concepts that underlie organizational performance are efficiency (doing things right) and effectiveness (doing the right things). Latest generation of performance management systems which came up in last 10-15 years, are multi-dimensional in nature and mainly focussing of strategic perspective. Traditional systems concentrated more on financial or productivity aspects. The measure return on investment (ROI), developed by DuPont Corporation in 1920's, and subsequent measures using pyramid of financial ratios, are still being used to measure financial health of an organization. Quality initiatives and measurement reporting given by Deming, Juran, Ouche, Feigenbaum became popular post-World War-II.

### **2.2.1 Enterprise Performance Management System**

An enterprise performance management system (EPMS) is a system having set of performance measures or key performance indicators (KPIs) to quantify efficiency, productivity, quality, and effectiveness of actions undertaken by the enterprise so as to monitor, control, manage and perform the activities. The information generated by the system must be accurate, relevant, timely and easily accessible for the persons who need them (Neely,1995, Bourne et al., 2003). Different organisations operate in different environments with different technologies and have different strategic objectives. Hence they will need

different performance measures (Otley, 1987, Anthony 1988, Simons 1990, Fitzgerald et al., 1991). Common to all is to decide what performance measures to use, how to set targets and what rewards to be associated with the achievement of performance targets (Otley, 1987).

Performance measurement can be defined as the process of quantifying the efficiency and effectiveness of action, performance measure is a metric used to quantify the efficiency and/or effectiveness of an action, and performance measurement system can be defined as the set of metrics used to quantify both the efficiency and effectiveness of actions (Neely, 1995).

### **2.2.2 New Enterprise Performance Management Models**

Many researchers in past, have proposed alternative performance management systems incorporating variety of performance measures to replace traditional performance measures but these models were having focus on a particular perspective such as economic value added (EVA), activity based costing (ABC), management audit, performance budgeting, performance benchmarking, total quality management (TQM), six sigma, and international standard organization certification (ISO) (Kaplan and Norton, 2001). Most of these models were lacking in strategic perspective, comprehensiveness and integral view of the business performance. The system designed for external reporting are heavily financially biased and are not correctly used to manage enterprise (Hayes and Abernathy, 1980). More emphasis needs to be given on strategic focus and competitive availability (Skinner, 1974). Cross and Lynch (1988) proposed performance pyramid, a structure of measures across the organization's hierarchy in order to integrate performance. According to Maskell (1991), traditional accounting performance measurement had five main problems: (i) lack of relevance to manufacturing strategy, (ii) traditional

overhead apportion causes significant cost distortion, (iii) inflexibility, (iv) hindrance to progress in world class manufacturing, and (v) subjection to need of financial accounting.

### **2.2.3 Multi Dimensional Performance Management Models**

Traditional financial measures such as Return on Investment (ROI), Net Present Value (NPV), Internal Rate of Return (IRR), Return on Capital Employed (ROCE), Economic Value Added (EVA) etc. are not adequate for enterprise performance evaluation. Multi-dimensional performance measurement systems have been proposed by many researchers to include leading indicators in multiple dimensions and perspectives. Chakravarthy (1986) suggested two leading measures such as stakeholder satisfaction and quality of enterprise transformation to be included along with financial measures. Sink and Tuttle (1989) stated that enterprise performance is a complex and inter-related between seven criteria such as effectiveness, efficiency, quality, productivity, quality of life, innovation and profitability. They also suggested four areas to be focussed in performance management viz. performance improvement planning, measurement and evaluation, improvement and control, and cultural support system. Eccles (1992) emphasized that leading indicators of business performance cannot be found in financial data alone. Quality, customer satisfaction, innovation, market share etc. often reflect a company's economic condition and growth prospects better than reported earnings. Toni and Tonchia (2001) is of the view that the traditional cost measures (the production costs and the productivity) are to be kept separate from the more innovative non-cost measures (quality, time and flexibility). For performance measurement system to be effective, both financial

and non-financial measures with greater consideration of human resources should be included.

Various enterprise performance management methodologies and tools have been suggested by researchers. Dixon et al. (1990) came out with Performance Measurement Questionnaire (PMQ) approach to find out strengths and weaknesses in the currently used in manufacturing performance measurement system. Performance measures used in PMQ were neither related to strategy of organization nor customers. He mentioned five characteristics of performance measurement system namely: (i) consistent with the business operating goals, objectives, critical success factors and programs, (ii) convey information through simple and few set of measures, (iii) focus on measures that customers can see, (iv) allows all members of the enterprise as to how their decisions and activities affect the entire business, and (v) support organisational learning and continuous improvement. Bradley (1996) suggests four additional requirements to be met, i.e. (i) a framework that allows a top down decomposition to successive levels in greater details and strategy and/or customer requirements to be translated into a set of critical performance measures that identify all the business processes, (ii) a business process focus, (iii) performance measures that are process oriented, quantitative in nature, related to a set of high level macro measures and related to either the strategy of the enterprise or its customers requirements, and (iv) enterprise strategy and/or customer requirement perspective.

Another performance measurement is system known as TOPP model by SINTEF (1992) in which four methodologies are used: self-audit, extended audit (experts), self assessment, and benchmarking. It reviews performance along three dimensions: effectiveness, efficiency, and changeability.

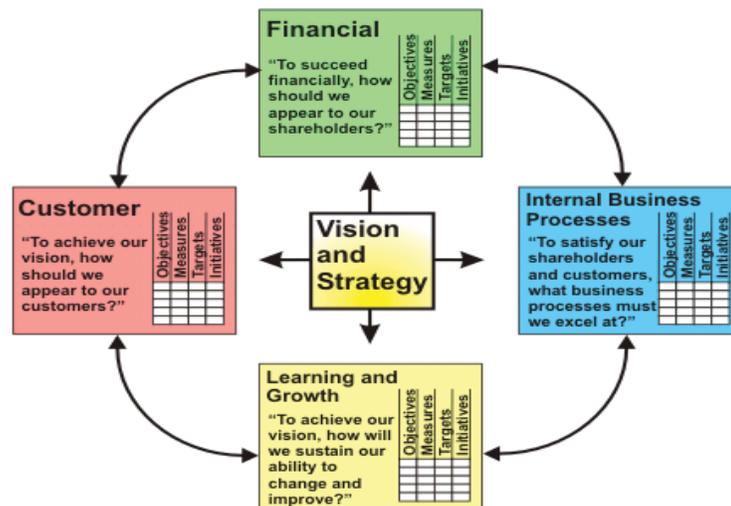
Performance measures in TOPP model are not directly related to strategy or customers requirement of enterprise. Harter et al. (2002) found a substantial relationship between unit-level employee satisfaction–engagement and business-unit outcomes. Changes in management practices that increase employee satisfaction may increase business-unit outcomes, including profit.

According to performance measurement system designed by European Network for Advanced Performance Studies (ENAPS) for manufacturing enterprises known as AMBITE (Advanced Manufacturing Business Implementation Tool for Europe) in which five macro business processes such as customer order fulfilment, vendor supply, design co-ordination, co-engineering, and manufacturing are mapped onto five macro measures of performance namely time, cost, quality, flexibility, and environment. Critical success factors of an enterprise is mapped to AMBITE framework to produce strategic performance indicators, which then are broken down to lower level performance indicators (Browne et al., 1998).

According to Epstein and Manzoni (1998), *tableau de bord*, introduced in early 1900's, a performance measurement system by process engineers that linked strategy to financial and non-financial measurements. Activity-based costing (ABC) was original idea that later led to balanced scorecard framework (Johnson and Kaplan, 1987; Kaplan and Burns, 1987). It is an accounting method where resource costs are assigned through activities used to develop products and services. This helps to understand product and customer cost better, and in strategic decision-making on process improvement initiatives, pricing and outsourcing.

Kaplan and Norton (1992, 1996) stated that traditional financial measurements (e.g. ROI, EPS etc.) provide misleading signals. They

popularized the concept of lead and lag measures. Lead measure that drive or lead to performance represented by lag measures. Lag measure, often represent historical data at end of a time period. They also proposed to assess the activities of tangible and intangible assets of an organization. They proposed a balanced set of measurement, consisting of non-financial measures in addition to financial measures, called Balanced Scorecard (BSC), where performance of an enterprise is measured along four dimensions/ perspectives namely financial, customer, internal business process, and learning & growth (Figure 2.1).

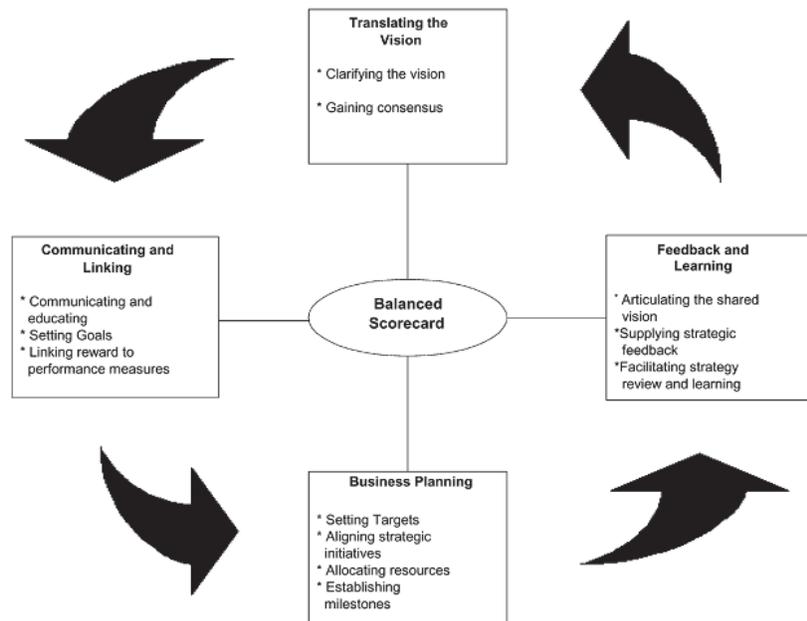


**Figure 2.1: Translating Vision and Strategy: Four Perspectives**

*Source: Kaplan and Norton (1996), HBR, Jan-Feb, p76*

It translates strategy into performance measures and targets, and help organizations to achieve breakthrough performance by focusing on what must be done. Learning and growth perspective describes investment in human and intellectual capital leading to three organizational capabilities: employees; information system; and motivation, empowerment and alignment. Internal business process perspective considers efficiency and effectiveness of

business processes. Innovation, operations, customer management, and regulatory and environmental are four critical processes to be linked with organization's strategy and measured. Customer perspective is about customer acquisition and retention, where product and services attributes, customer relationship and organization image are critical factors. Financial perspective is to increase financial performance and stakeholder's value. Managing four processes of translating the vision, communicating and linking, business planning, and feedback and learning are depicted in Figure 2.2.



**Figure 2.2: Managing Strategy: Four Processes**

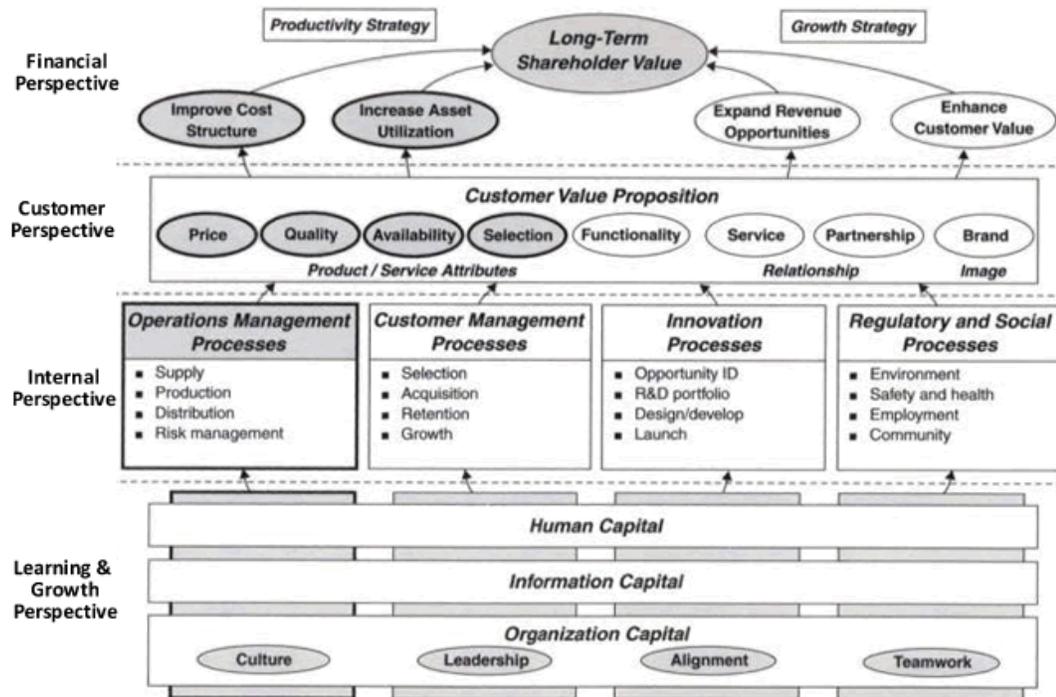
*Source: Kaplan and Norton (1996), HBR, Jan-Feb, p77*

According to Kaplan and Norton (2002), the purpose of BSC is to build strategy focused organization. To ensure strategy gets implemented, five principles of a strategy focused organization needs to be followed: (i) Translate strategy to operational terms by strategy mapping and showing cause and effect linkage between measures (Figure 2.3), (ii) Align organization to strategy: strategy should align with resources, departments and business units, (iii) Make

strategy everyone' everyday job i.e. it is concerned with communication of organization vision to everyone, creating strategic awareness, and align personal objectives and incentive compensation into organizational plan, (iv) Make strategy a continuous Process i.e. strategy should be an ongoing and never ending process and the budgeting processes have to be linked with strategy, and (v) mobilize change through executive leadership i.e. senior executives through leadership to drive transformation. In a survey of 500 responses, only 15 per cent showed breakthrough results as they have made balanced scorecard as an integral part of strategic planning processes. The balanced scorecard is considered one of the most significant developments in management accounting (Atkinson and Waterhouse, 1997). According to Cooper (1995), process measures are most critical achievement of customer and shareholders objectives such as cost, quality, throughput, and time. These parameters need to be defined and measured. One has to outperform competitor on all processes, time, productivity, cost, and inequality to lead a distinctive and sustainable competitive advantage. Kaplan and Norton proposed a strategy map (Figure 2.3), which depicts linkages among objectives in four perspectives as to how they create value for the organization.

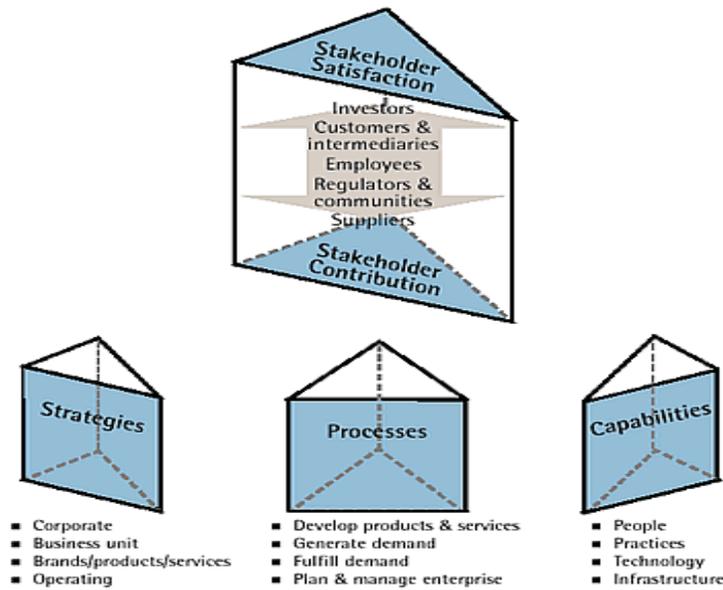
Neely et al. (2002) conceptualized a 'performance prism' framework, which depicts the measurement as the process of gathering management intelligence. Performance prism is a three-dimensional model having five facets for delivering stakeholders value. These facets are: (i) stakeholders satisfaction i.e. to know who are stakeholders and their needs, (ii) strategies i.e. what strategy to be adopted to satisfy stakeholders needs, (iii) processes i.e. what are the required processes to execute these strategies, (iv) capabilities i.e. what capabilities needed to operate and enhance these processes, and (v)

stakeholders contribution i.e. what stakeholders are required to do to develop and maintain these capabilities.



**Figure 2.3: Strategy Map**

(Source: Kaplan and Norton (2004), *Strategy Maps*, p 11)



**Figure 2.4: Performance Prism**

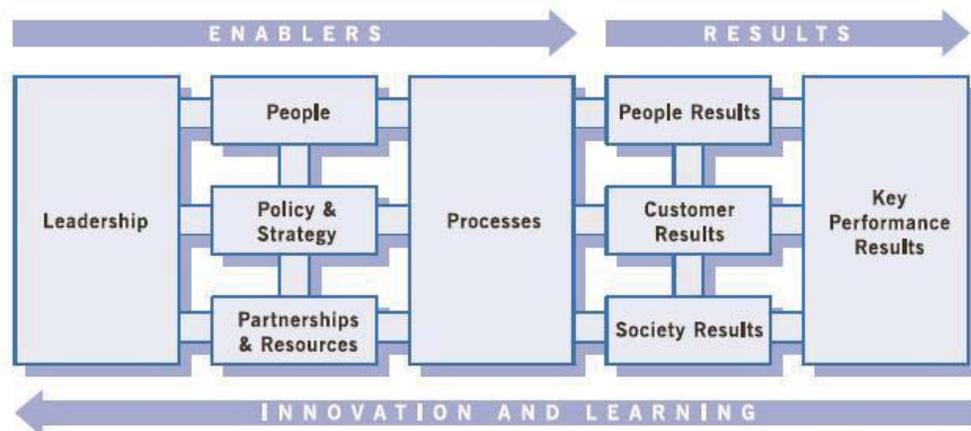
Source: Neely, Adams and Kennerley (2002), *Performance Prism*

Elkington (1998) introduced a performance reporting structure known as 'triple bottom line' on sustainability reporting, by large corporations to help society to improve economic prosperity, environmental protection, and social equity. USA enacted the Sarbanes-Oxley Act, 2002 in response to corporate accounting scandals in big companies like Enron, WorldCom, and Global Crossings. The act, in short is known as SOX, mandated U.S. corporations to report on financial as well as internal processes and incorporated severe penalties for non-compliance (Zhang, 2005).

There is a need for supply chain performance measurement to develop framework, and doing empirical cross-industry research to include partnership, collaboration, agility, flexibility, information productivity, and business excellence to adopt performance measurement system for new era supply chain (Guknur and Turan, 2010). An analysis of survey of 800 SME firms in U.K. in 1992 suggested that firms compete on quality and time, place most emphasis on performance measures matching strategy rather those competing on price (Neely et al., 1994). Though underlying conceptual issues have been addressed in modern performance measurement frameworks, practicalities of measurement have not received adequate attention. Further research is required to fulfil measurement needs at operational level (Tangen, 2004).

Performance management system (PMS) is a process to manage and control organization. It is a structured review process with correct balance to be adopted between organizational benefits and effort required to maintain effectiveness of PMS (Najmi et al., 2005). Review of various PMS reveals that basis of performance measurement is changing and performance measures should provide information, which helps world-class manufacturing performance improvement (Ghalayini and Noble, 1996).

The European Foundation for Quality Management (EFQM) developed an excellence model, which is a self-assessment framework for measuring the strengths and areas for improvement of an organisation across all of its activities, i.e. what it does or what it can do, in order to provide excellent products or services to its customers, or stakeholders. Key performance results are achieved through leadership, strategy and policies, people, and partnerships and resources to achieve results related to people, customer, and society, which in turn leads to excellence in key performance results. Five enablers and four result areas are depicted in Figure 2.5. To collect evidences, questions are asked such as how good are we and how could we improve in all nine areas.



**Figure 2.5: EFQM Excellence Model**

Source: [www.efqm.org](http://www.efqm.org)

Flexible Strategy Game Card (Sushil, 2010) incorporates duality of strategic perspective i.e. enterprise perspective and customer perspective. Enterprise perspective is related with situation, actor, process and performance. Situation factors act as diagnostic measures of the strategy, which can be external and internal. Actor factors being internal and external, and associated with effectiveness of strategy execution. Process factors are linked with internal and external business processes. Performance factors are

strategic outcome measures both financial and non-financial. Under the customer perspective, factors are generic and specific. This game-card can be used for playing strategy game in terms of strategy formulation and execution.

#### **2.2.4 Performance Benchmarking**

Benchmarking provides an important means to measure what a company, business, or system is doing and is a process of comparing the cost, cycle time, productivity, or quality of a specific process or method to another best industry standard or best practice. It is a continuous process to improve organizational practice. According to Yasin (2002), the scope of benchmarking has expanded to include strategies and systems. Recently competitive global environment has forced manufacturing organizations to change performance measurement and management system so as to remain competitive (Gomes et al., 2004). Competitive benchmarking like quality related metrics has made performance measurement revolution more real (Camp, 1989). Benchmarking methodology set greater emphasis on non-financial measures and affects mind-set of managers and perspective also. Internal benchmarks are less effective in performance improvements and also breed complacency (Eccles, 1991).

#### **2.2.5 Implementation Issues and Their Impact**

Researchers have examined the effect of EPM implementation, causes of success and failures, and other implementation issues. Martinez and Kennerley (2005) studied EPMS in energy companies in Europe and found that it has mix of positive and negative effects. Eight positive effects identified include; focus on important aspects, business improvement, improvement in customer satisfaction, increase in productivity, alignment of operation with strategy, improvement of employee satisfaction, continuous improvement in culture, and

improvement in company reputation. While identified seven negative effects include; being time consuming, involve considerable investment, bureaucratic in nature, having over-complicated measures, misleading prioritization, mechanistic and monotonous.

Ittner and Larcker (2003) have studied more than 60 service and manufacturing companies and discovered that only a few companies are able to achieve benefits of non-financial measures. The four reasons attributed by them are: non-linkage of measures with strategy, non-validation of cause and effect relationship, non-setting of right performance targets, and use of incorrect measurement i.e. statistical validity and reliability of metrics.

Data generation in respect of non-financial measures such as market share, quality, innovation, customer satisfaction and employee satisfaction is less often quarterly or annual and rarely become part of regular reporting to managers. Flow of information at various levels in the organization is another important issue which affects performance measurement and decision-making (Eccles, 1991).

Gimbert et al. (2010) have established from an empirical study of 349 large and medium companies in Spain that there is a positive association between strategic performance measurement system (SPMS) used by top management and comprehensive strategic decisions/agenda in terms of number and variety in each strategic review/reformulation. Strategic agenda as per prior studies does corporate strategic change. Edson and Lima (2009) developed a process to integrate operations strategy with operations performance measurement system, which leads to consistency in strategy implementation. Lack of BSC acceptance by the employees due to inadequate communication by the management, lead to weak BSC implementation (Chen,

2009). Due to uncertainty and competition, Chinese put greater emphasis on growth and according to an empirical study of 104 Chinese manufacturing firms, a linkage has been established that those firms making greater use of BSC are performing at high levels (Fleming et al., 2009).

To effectively adopt and realize the benefit of performance management system, long-term planning, short-term planning and management reporting should be synchronized. Senior executives and business line managers should collaborate and communicate. Organizations adopting effective PMS, have flexibility of devoting more time in proactive informed decision-making and less time in reacting (Thomas and William, 2005).

Bourne et al. (2003) stated the following problems being encountered in EPMS design and implementation as reported by various practitioners are:

- (i) Difficulties in evaluating the relative importance of measures and the problems of identifying the true 'drivers'.
- (ii) Metrics are too poorly defined.
- (iii) Goals are negotiated rather than based on stakeholders requirement.
- (iv) Non use of state of the art improvement methods.
- (v) Time and expense.
- (vi) The need to quantify results in areas that are more qualitative in nature.
- (vii) Large number of measures diluting the overall impact.
- (viii) Difficulty in decomposing goals for lower levels of the organization.
- (ix) The need for a highly developed information system.
- (x) Striving for perfection.

A few studies have been conducted on measurement of impact of EPMS and analysis of its implementation issues. Lingle and Schiemann (1996) and

Gates (1999) found that enterprises which are managed through balanced PMS normally perform better. Lingle and Schiemann (1996) and Ittner, Larcker and Randall (2003) found that organisations using financial and non-financial measures extensively and link strategic measures with operational measures, have higher stock market returns. A study by Lawson, Stratton and Hatch (2003) reveals that the use of PMS as a management control tool increases sales and profits, and reduces the overhead costs by 25 per cent. The PMS also have positive impact benefits such as effective communication (Malina and Selto, 2001), and development of managerial capabilities (Weinstein and Castellano, 2004). PMS impact analysis have two dimensions viz. external and internal. The positive external impacts is in terms of improvement of sales and market expansion (Evans, 2004; Larcker, 2004), improvement of reputation and leadership (Anderson et al., 1994), increase in income per employee (Gubman, 1998), improvement of customer satisfaction (Davis et al, 2004). Internal impacts are in terms of improvement in top management commitment (Cavalluzzo and Ittner, 2004), and enhancement of staff motivation (Godener and Soderquist, 2004). The internal impact of PMS ultimately affects the external impact of PMS. Frigo and Krumwiede (1999), de Waal (2003) and Sandt et al (2001) suggested that the use of highly balanced PMS facilitates well-balanced decision-making, which in turn has positive impact on business results. A study by Dumond (1994) and Lawson, Stratton and Hatch (2003) found that using PMS and linking scorecard systems to compensations and rewards significantly increases employee satisfaction. The study by Lingle and Schiemann (1996) and Lawson Stratton and Hatch (2003) reveals that organisations updating the strategic scorecard regularly support change in business strategies. Vasconcellos (1988) and Ketelhohn (1998) found that use

of appropriate performance indicators enhances the implementation and acceptance of the business strategy as well as enhances employee understanding of the company business.

There are a few criticisms of balanced scorecard by various researchers. First, there are no empirical studies providing causality among perspectives as proposed by Kaplan and Norton (Norreklit, 2000). Process improvement (Ittner and Larker, 1997), customer satisfaction (Ittner and Larker, 1997; Kirn and Quinn, 1998) have found to be linked to improved profitability but no study has linked all perspectives together. Second, the idea of limiting the number of measures in a perspective reduces the value of lead indicators (Kennerley and Neely, 2000, Egalsen and Waldersee, 2000). Third, grouping of all measures into four perspective is not easy task and therefore some organizations have started using many perspectives (Kennerley and Neely, 2000). Balanced scorecard is not too simple to use in large organizations (McLean, 2006) and it is also not balanced (Pickard, 2006, Sushil, 2009).

According to U.S. department of energy, pacific northwest national laboratory (1999), major pitfalls of PMS under four key processes are as described below.

- I. Determination of goals and objectives
  - (i) Measures not linked to strategy
  - (ii) Measures not driven below into the organization
  - (iii) Existence of too many measures
  - (iv) Not enough critical measures
  - (v) Focusing only on short-term
  - (vi) Conflicting measures

- II. Monitoring progress
  - (i) Measuring progress too often
  - (ii) Not measuring progress often enough
  - (iii) Collecting too much data
  - (iv) Collecting Inconsistent, unrepresentative or unnecessary Data
- III. Evaluation
  - (i) Dumbing the data by summarising
- IV. Implementation of actions for improvement
  - (i) Driving the wrong performance
  - (ii) Encouraging competition and discouraging teamwork
  - (iii) Failure to base business decisions on data

### **2.2.6 Enterprise Performance Management and Risk Management**

Risk management should be considered as third leg of shareholders value creation alongwith productivity and revenue growth (Kaplan, 2009). He suggested a three-level risk management framework parallel to strategy scorecard. They identified three categories of risks, based on predictability, controllability, and management and magnitude of their consequences to the enterprise. Level-3 risk is the lowest category and routine operational and compliance risks, level-2 is strategy risks, and level-1 is global enterprise risks. Risk management should be anticipatory and preventive but not reactive. He suggested a Risk Scorecard and Heat Map Score as shown in Figure 2.6 and Figure 2.7. Risk management requires company leaders to turn down opportunity that expose to excessive risk although looking profitable.

**Likelihood of the Event**

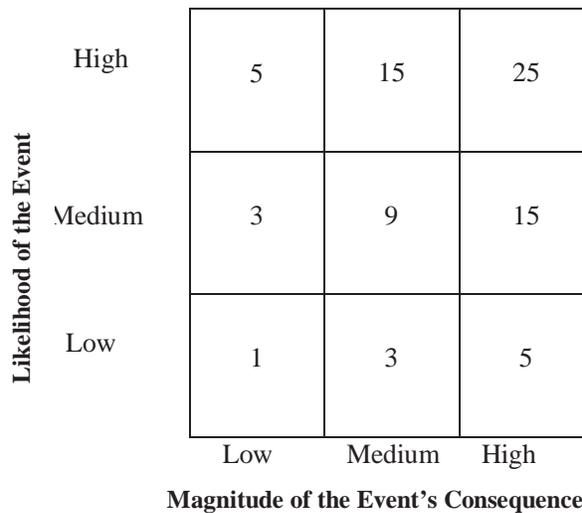
<b>Score</b>	5	4	3	2	1
<b>Rating</b>	Virtually Certain	Likely	Even Odds	Unlikely	Remote
<b>Probability event will occur in next 36 months</b>	95%	75%	50%	25%	5%

**Magnitude of the Event's Consequences**

<b>Score</b>	5	4	3	2	1
<b>Consequences</b>	Highly Adverse	Adverse	Moderate Impact	Some Impact	Little Impact

**Figure 2.6: Risk Scorecard**

*Source: Kaplan (2009), Risk Management and Strategy Execution, Balanced Scorecard Report, Vol. 11, No. 6, p 1-6*



**Figure 2.7: Heat Map Scorecard**

*Source: Kaplan (2009), Risk Management and Strategy Execution, Balanced Scorecard Report, Vol. 11, No. 6, p 1-6*

**2.2.7 Key Performance Indicators/ Performance Measures**

Need for performance measurement is to measure, monitor, control, and improve performance. The topic of performance measurement can be better understood by asking following questions.

- (i) How do you know where to improve?
- (ii) How do you know where to allocate or re-allocate money, resources and people?

- (iii) How do you know how to compare with others?
- (iv) How do you know whether improving or declining?
- (v) How do you know whether or which programs, methods, or employees are producing results that are cost effective and efficient?

Need for an enterprise performance measurement and management system can be better understood by the following statements (Halachmi, 2002).

- (i) If you cannot measure it, you do not understand it.
- (ii) If you cannot understand it, you cannot control it.
- (iii) If you cannot control it, you cannot improve it.
- (iv) If they know you intend to measure it, they will get it done.
- (v) If you do not measure results, you cannot tell success from failure.
- (vi) If you cannot see success, you cannot reward it.
- (vii) If you cannot reward success, you are probably rewarding failure.
- (viii) If you do not recognize success, you may not be able to sustain it.
- (ix) If you cannot see success/failure, you cannot learn from it.
- (x) If you cannot recognize failure, you will repeat old mistakes and keep wasting resources.
- (xi) If you cannot relate results to consumed resources, you do not know what is the real cost.
- (xii) If you do not know the actual cost, you cannot tell whether or not you should do or outsource it.
- (xiii) If you cannot tell the full cost, you cannot get the best value for money when contracting out.
- (xiv) If you cannot demonstrate results, you may undermine your ability to communicate with important stakeholders and you cannot win public support because you provide value for money.

### ***Characteristics of Good Performance Measures***

Researchers have discussed the design of performance measures and different requirements to be met. Crawford and Cox (1990) believe that performance measures should be easy to understand and measure and reporting through graph. Performance measures should be derived from strategic objectives to ensure that employee behaviour is consistent with corporate goals (Dixon et al., 1990; Cross and Lynch, 1992; Kaplan and Norton, 1992; Bourne et al., 2003). Measures should also provide timely, relevant and accurate feedback and be a part of a closed management loop (Globerson, 1985). According to Latham (2001), KPI should be 'SMART' (specific, measurable, attainable, relevant and time-bound). Similarly another definition in terms of acronym 'SMARTER' (specific, measurable, attainable, relevant, time-bound, efficacy, and rewarding).

Globerson (1985) suggested following guidelines for selection of performance measures:

- (i) Performance criteria must be chosen from the company's objectives.
- (ii) Performance criteria must make possible the comparison of organizations which are in the same business.
- (iii) The purpose of each performance criterion must be clear.
- (iv) Data collection and methods of calculating the performance criterion must be clearly defined.
- (v) Ratio-based performance criteria are preferred to absolute number.
- (vi) Performance criteria should be under control of the evaluated organizational unit.
- (vii) Performance criteria should be selected through discussions with the people involved (customers, employees, managers).

(viii) Objective performance criteria are preferable to subjective ones.

### ***Types of Performance Measures / Key Performance Indicators (KPI)***

#### ***Financial and Non-Financial Indicator:***

Financial KPIs are financial in nature such as revenue, margin, ROI etc. Non-financial indicators are related with efficiency, effectiveness, and productivity. Majority are non-financial KPIs. It is also desirable that performance measures both financial and non-financial are used (Kaplan and Norton, 1992) and short-term and long-term results are considered (Tangen, 2004).

#### ***Lagging or Outcome and Leading or Driver KPIs:***

Lagging KPI are those measuring output of past activity. Leading KPIs (also known as value drivers) measure activities that have significant impact on outcome KPIs. Leading KPIs measure activity in current state or future state (number of sales meetings scheduled in next two weeks) and gives more time to managers to adjust behaviour to influence desired outcome. An outcome KPI in one scorecard may be driver KPI in another. Majority of KPIs are outcome or lagging indicators. Many organizations find it difficult to define drivers of future performance accurately. A brainstorming session identifies desired outcome and then should answer “what activities or behaviour will drive or lead to that outcome?”. It is an iterative process to find few root causes impacting desired outcome. Majority are outcome or lagging indicators.

#### ***Quantitative and Qualitative KPIs:***

The first is based on quantitative data while the latter is based on subjective or qualitative data. Quantitative data is used to measure activity by counting, adding or averaging. Majority are quantitative KPIs. Qualitative KPIs such as customer or employee satisfaction are derived from surveys, which is

subjective interpretation of their opinion on various issues. These KPIs are also used to optimise processes and refine products.

### **2.2.8 Characteristics of Good Enterprise Performance Management System**

Various authors have described different requirements to be fulfilled in designing EPMS (Neely et al., 1997; Franco and Bourne, 2003; Bauer et al., 2004; Najmi et al., 2005). Characteristics of good EPMS are:

- (i) It should provides accurate information;
- (ii) It should support strategic, tactical and operational objectives;
- (iii) It must guard against sub-optimization; and
- (iv) It has limited number of performance measures.

EPMS should avoid sub-optimization by linking top to bottom to ensure that employee behaviour is consistent with corporate goals (Neely et al., 1997). Bourne et al. (2003) describe that during last 20 years, five different aspects in performance measurement changed are: focus, dimensions, drivers, targets and desired benefits. It should cover requirement regarding: used performance criteria; stakeholders; hierarchical levels; time-horizon; and information architecture. Neely et al. (2002) propose that besides the investors, other stakeholders such as employees, customers and suppliers should be considered in EPMS design. The new EPMS required by world class manufacturing enterprises should have the following characteristics (Maskell, 1991):

- (i) They are directly related to the manufacturing strategy.
- (ii) They primarily use non-financial measures.
- (iii) They vary between locations.
- (iv) They change over time as needs change.

- (v) They are simple and easy to use.
- (vi) They provide fast feedback to operators and managers.
- (vii) They are intended to foster improvement rather than simply monitor performance.

### 2.2.9 Types of Scorecards/ Dashboards

Three levels of scorecards have been proposed by Philips and Winsor of Cognos, i.e. strategic level, tactical level, and operational level. At each level, focus, use, scope, users, KPIs, data requirements, reporting periodicity would be different as given in Table 2.1.

**Table 2.1: Hierarchy Levels of Scorecard**

	<b>Strategic</b>	<b>Tactical</b>	<b>Operational</b>
<b>Focus</b>	Execute strategy	Optimize process	Control Operations
<b>Scope</b>	Enterprise	Departmental	Operational
<b>Use</b>	Management	Analysis	Monitoring
<b>User</b>	Executives	Managers	Staff
<b>Metrics</b>	Outcome KPIs	Driver KPIs	Driver KPIs
<b>Data</b>	Summary	Details/Summary	Details
<b>Source</b>	Manual	External Manual/ Core system	Core System
<b>Periodicity</b>	Monthly/ Quarterly	Daily/ Weekly	Intra-day
<b>Looks Like</b>	Scorecard	Portal	Dashboard

Source: Philips and Winsor, Cognos. [www.cognos.com](http://www.cognos.com)

### 2.2.10 Enterprise Performance Management and Flexibility

An empirical study of 175 Canadian SME manufacturing companies related to supply chain showed a direct effect of strategy on flexibility and flexibility on performance (Kamel et al., 2009). Innovative strategy firms should invest in development of new product and flexibility in delivery while customer oriented firm should invest heavily in developing sourcing, product, and flexibility in delivery. Information system flexibility improves overall performance. SME segment having limited resources should assess strategic needs carefully

before adoption of flexibility in different dimensions otherwise it can result in competitively negative performance. Purbey, Mukherjee and Bhar (2007) have provided performance measurement system (PMS) framework for healthcare processes. Healthcare processes are sensitive to changes in the external and internal environment and hence healthcare PMS should have multi-perspectives such as efficiency, effectiveness and flexibility. It is observed that flexibility dominant type firm's top management use more number of diverse measures and PMS to support strategic decision-making, legitimate actions and organizational attention to a greater extent in comparison with control dominant type firms (Henri, 2006).

Chenhall (1996) studied the performance of 37 manufacturing firms and found a positive association of high degree of manufacturing flexibility, performance measurement and organizational performance. Firms must become more efficient, flexible, and customer-oriented to be able to compete in the global economy. Government providing supportive infrastructure and strategic choices of the firms together determines the competitive edge of firm (Halachmi, 2002). Sharma (2010) has studied the effect of various flexibilities on competitiveness, which enhances performance in mobile telecom companies in India. Strategic, financial, marketing, and operational flexibilities are best predictors of competitiveness and affect various perspectives of performance.

According to a study on strategic flexibility in the energy sector by Deloitte consulting, and Deloitte and Touche (2001), ten areas of energy sector posing threats and opportunities are: liberalization, globalization, energy supplies, geo-politics, economic conditions, environmental concerns, information and communication technology, energy technology, terrorism and

organized crimes, and customer demands. They suggested three pronged strategy to be adopted viz. adoption of strategic flexibility to deal best with uncertainty; creation of strategically flexible organizations to deal with wide range of potential threats and opportunities using techniques such as scenarios, real options, financial options; and addressing uncertainty rather denying or resisting it.

### 2.2.11 Issues of Enterprise Performance Management

Key issues related to enterprise performance measurement and management is summarized in Table 2.2.

**Table 2.2: Key Issues of Enterprise Performance Management**

Authors	Key Issues
Kaplan & Norton (1996, 1997), (Skinner, 1974), Neely et. al. (1998, 2002), Edson and Lima (2009), Lingle and Schiemann (1996), Ittner, Larcker and Randall (2003)	Strategic alignment and strategic focus for effectively monitoring and driving performance improvements.
Sushil (2009)	Performance to be managed from dual perspective of enterprise & customers
Kaplan & Norton (1996, 1997), Sushil (2010), Gimbert et al. (2010), Fleming et al. (2009), Thomas and William (2005).	Strategic monitoring
Sink and Tuttle (1989), Kaplan & Norton (1996, 1997), Neely et. al. (1998, 2002)	Efficiency and productivity improvements
Sink and Tuttle (1989), Kaplan & Norton (1996, 1997), Neely et. al. (1998, 2002)	Effectiveness
Chakravarthy (1986), Sink and Tuttle (1989), Kaplan & Norton (1996, 1997), Neely et. al. (1998, 2002)	Quality
Chakravarthy (1986), Kaplan & Norton (1996, 1997), Neely et. al. (1998, 2002)	Customer satisfaction and other stakeholders satisfaction, market share
Sink and Tuttle (1989), Kaplan & Norton (1996, 1997), Neely et. al. (1998, 2002)	Innovation and learning and Employee satisfaction
Chenhall (1996), Deloitte and Touche (2001), Halachmi (2002), Purbey et. al. (2007), Kamel et. al. (2009), Sharma (2010).	Flexibility and its effect on performance measurement and management.
Kaplan (2009)	Risk Assessment and mitigation
Camp (1989), Eccles (1991), Yasin (2002), and Gomes et al. (2004)	Benchmarking
Lynch and Cross (1991),	Hierarchy of measurement
(Eccles, 1991), Maskell (1991), Malina and Selto (2001), Ittner and Larcker (2003), Bourne et al. (2003), Weinstein and Castellano (2004), Martinez and Kennerley (2005), Thomas and William (2005), Chen (2009), Fleming et al. (2009), Gimbert et al. (2010).	Implementation issues and its impact on EPMS effectiveness and performance improvement.

## **2.3 Concept of Flexibility**

Flexibility is a multi-dimensional concept associated with change, innovation and novelty; demanding agility and versatility; coupled with robustness and resilience; implying stability, sustainable advantage and capabilities that may evolve over time (Bahrami, 1992). “Flexibility is the degree to which an organization has a variety of managerial capabilities and the speed at which they can be activated, to increase the control capacity of management and improve the controllability of the organization” (Volberda, 1996a). Flexibility is to incorporate the ability of the firm to develop new products, enter new markets and industries (Dreyer and Gronhaug, 2004). Flexibility has many dimensions and various types of flexibilities discussed in literature are briefly outlined below. Flexibility is the exercise freedom of choice on the continuum to synthesize the dynamic interplay of thesis and antithesis in an interactive and innovative manner, capturing the ambiguity in systems and expanding the continuum with minimum effort and time (Sushil, 2000).

### ***Internal and External Flexibility***

Flexibilities associated with external and internal environment of an organization are known as external and internal flexibilities. External flexibility can be achieved defensively through sufficiently diversified product-market posture to minimize the effect of catastrophe and/or offensively by putting the firm into areas to likely benefit from breakthrough. Internal flexibility attempts to respond to contingencies (Ansoff, 1965).

### ***Active and Passive Flexibility***

Passive flexibility refers to limiting the impact of environmental changes on the organization. “Flexibility can be seen as a characteristic of an organization that

makes it less vulnerable to unforeseen external changes or puts it in a better position to respond successfully to such a change” (Eppink, 1978).

### ***Strategic Flexibility***

Flexibility necessary to compensate for strategic changes that originate in indirect environment and reach via component of direct environment (Eppink, 1978).

### ***Competitive Flexibility***

Flexibility necessary to react to changes in the direct environment (Eppink, 1978).

### ***Operational Flexibility***

Flexibility required for changes, which are familiar and often lead to a temporary change in the level of activity of the organization. (Eppink, 1978).

### ***Manufacturing Flexibility***

It is operation’s ability to take up different positions or to adopt a range of states, and the ease with which a system moves from one state to another, in terms of time and cost. It has five dimensions namely product, product mix, quality, volume and delivery (Slack, 1983). Browne et al.(1984) defined eight dimensions of manufacturing flexibility as machine, process, product, routing, volume, expansion, operation and production flexibility.

### ***Innovation Flexibility***

Flexibility to reduce the response time for bringing new products to market. It requires a structure of multifunctional teams, few hierarchical levels and few process regulations (Volberda, 1996).

### ***Organizational Flexibility***

Flexible organization requires that business processes are integrated end-to-end, enabling it to respond with flexibility and speed to any customer demand, market opportunity or external threat (Shi and Daniels, 2003).

### ***Technical Flexibility***

It refers to freedom of choice to the organization in terms of available technology platform. Flexibility created in core processes of technology of related business, which help in gaining competitive advantage (Parsons, 1983; Clemons and Row, 1991).

### ***IT Flexibility***

Flexibility required in information system in terms of flexibility to use and flexibility to change the information system (Gebauer and Lee, 2008).

### ***Functional Flexibility***

Flexibility in functions such as marketing flexibility, financial flexibility etc. Marketing flexibility is the ability to have a high market share/ strong market present (Abott and Banerji, 2003). Ability of transnational corporations in response to changing environment, to recalibrate its marketing effort in a short period (Grewal and Transtutj, 2001).

#### **2.3.1 Strategic Flexibility**

The issue of strategic flexibility has been considered in strategic management, organization theory, marketing and economics and there is diverse range of definitions (Genus, 1995). It is closest to everyday understanding of flexibility, and it is the ability to do something other than originally intended. It is a function of event impacted the company, by necessity instead of choice, being used to denote the company's deliberate or emerging capabilities to manoeuvre offensively or defensively (Evans, 1991). Strategic flexibility is necessary to

compensate for strategic changes which originate in the indirect environment but reach it via component of direct environment of the organization (Eppink, 1978). The changes are very dynamic, urgent and high degree of unfamiliar. It is the ability to precipitate intentional changes and adapt to environmental changes through continuous re-thinking of current strategies, asset deployment and investment strategies (Evans, 1991; Bahrami, 1992; Sanchez, 1995). It also jointly depends on resource flexibility and co-ordination flexibility (Sanchez, 1995). Substantial environmental uncertainty creates the need for strategic adaptation (Aaker and Mascarenhas, 1984). It is also variation and diversity of strategy and rapid shift from one to another strategy (Slack, 1983; Nadkarni, 2007).

The strategic flexibility related issues are unstructured and non-routine. Therefore management may have to change plans, dismantle current strategies (Harrigan, 1985), apply new technologies or renew its products. Its response may be external such as influencing consumers through advertising and promotions (Mascarenhas, 1982), creating new product market (Krijnen, 1979), using market power to control and deter entry of competitors (Porter, 1980), or engaging in political activities to counteract trade regulations. Strategic flexibility provide adapting to uncertain and rapid environmental changes which impact organizational performance. The analysis of potential changes in the environment and cost-benefit evaluation of strategic flexibility will determine its need and most appropriate approach (Aaker and Mascarenhas, 1984).

### ***External Strategic Flexibility***

Every organization face external as well as internal environment. Achrol (1999) states that the environment includes external factors such as economic,

political, regulatory and social changes, which affect primary and secondary tasks environment of the organization. Changes in company's environment result in re-assessment of strategy among strategic alternatives (Porter, 1980; 1985, Harrigan, 1986). The strategic choice is based on company's evaluation of environment (Parnell, 1994).

### ***Internal Strategic Flexibility***

To achieve objectives, every organization manage its structure, processes and people through various strategies. Three types of strategy according to level of decision-making are: corporate level strategy, business level strategy and functional level strategy (Burnes, 1992). A flexible firm has the ability to change itself in such a way that it remains viable. The changes may be at three levels of decision-making such as strategic level, organizational level and operational level. The corresponding flexibilities are strategic flexibility, structural flexibility and operational flexibility (Krinjnen, 1979). Two critical components of strategic flexibility are resource flexibility and coordination flexibility, which are controlled by internal environment of the company (Sanchez, 1995).

A flexible strategy framework has been proposed to manage different continuity and change forces in organizations with strong legacy facing tremendous turbulence due to globalization (Sushil, 2005). A continuity and change matrix is presented, where broad set of strategies as a guideline, are presented for various combination of continuity and changes forces.

Strategic flexibility has no agreed definition. Different researchers have given various definitions related to different perspectives as summarized in Table 2.3

**Table 2.3: Key Definitions of Strategic Flexibility**

<b>Author and Year</b>	<b>Definitions</b>
Sushil (2005)	“Organizations that are under high continuity forces as well as high change forces are ‘Synthesizers’ and are supposed to exhibit strategic flexibility to integrate the opposing forces acting simultaneously.”
Roborts and Stockport (2009)	“As strategic choice available to company and the company’s ability to take advantage of those chices”
Combe and Greenley (2004)	“Is used to denote the ability of the firms to respond and successively adapt to environmental change” (p. 1458) “The extent to which new and alternative options in strategic decision making are generated and considered”. (p. 1458)
Shimizu and Hitt (2004)	“Strategic flexibility can be defined as an organization’s capability to identify major changes in the external environment (e.g., introduction of disruptive technologies), to quickly commit resources to new courses of action in response to change, and to recognize and act promptly when it is time to halt or reverse such resource commitments” (p. 45)
Johnson, Lee, Saini and Grohman (2003)	“The firm’s intent and capabilities to generate firm-specific real options for the configuration and reconfiguration of appreciably superior customer value propositions” (p. 77)
Grewal & Tansuhaj (2001)	“Strategic flexibility represents the organizational ability to manage economic and political risks by promptly responding in a proactive or reactive manner to market threats and opportunities”. (p. 72)
Volberda (1999)	“Strategic flexibility or non-routine steering capacity consists of managerial capabilities related to the goals of the organization or the environment”. (p. 103)
Young-Ybarra and Wiersema (1999)	“The flexibility to modify the alliance and the flexibility to exit the alliance relationship when the alliance is performing poorly” (p.440)
Volberda (1998)	“A firm has to develop flexible capabilities for speed and surprise. These capabilities derive from broad knowledge bases, generalisable resources, and core competencies that can be applied in various ways.” (p. 89)
Hitt, Keats and DeMarie (1998)	“The capability of the firm to pro-act or respond quickly to changing competitive conditions and thereby develop and/or maintain competitive advantage” (p.27).
Buckley and Casson (1998)	“Ability to reallocate resources quickly and smoothly in response to change” (p.23)
Matusik and Hill (1998)	“A firm’s ability to respond quickly to changing market conditions” (p.682).
Sanchez (1997)	“The condition of having strategic options that are created through the combined effects of an organizations co-ordination flexibility in acquiring and using flexible resources”. (p. 71)
Lei, Hitt and Goldhar (1996)	“Strategic flexibility suggests that firms will need to become more adept at responding to competitor moves while engaging in opportunistic searches for under-served or unlocated market segments and niches” (p.512)
Lau (1996)	“Strategic flexibility refers to a firm’s ability to respond to uncertainties by adjusting its objectives with the support of its superior knowledge and capabilities” (p.11).
Volberda (1996)	“Flexibility is the degree to which an organization has a variety of managerial capabilities and the speed at which they can be activated, to increase the control capacity of management and improve the controllability of the organization” (p. 361).
Das and Elango (1995)	“The ability of an organization to respond to changes in the environment in a timely and appropriate manner with due regard to competitive forces in the marketplace” (p.62).

Upton (1995)	“Whether one is referring to products, production volumes or manufacturing processes, flexibility is about increasing range, increasing mobility, or achieving uniform performance across a specific range” (p.76).
Hayes and Pisano (1994)	“The capability to switch gears-from, for example, rapid product development to low cost-relatively quickly and with minimal resources”(p.78)
Bahrami (1992)	“The ability to precipitate intentional changes, to continuously respond to unanticipated changes, and the ability to adjust to unexpected consequences of predictable changes” (p.36).
Evans (1991)	“Capability to modify strategies” (p.77).
Galbraith (1990)	“The ability to shift or replicate core manufacturing technologies quickly and effectively between different facilities, both domestically and internationally” (p.56).
Harrigan (1985)	“The ability of firms to reposition themselves in a market, change their game plans, or dismantle their current strategies when the customers they serve are no longer as attractive as they once were” (p.1).
Kogut (1985)	“Flexibility is gained by decreasing the firm’s dependence on assets already in place” (p.27)
Aaker and Mascarenhas (1984)	“The ability of the organization to adapt to substantial, uncertain and fast-occurring (relative to required reaction time) environmental changes that have meaningful impact on the organization’s performance” (p.74).
Eppink (1978)	“Flexibility makes an organization less vulnerable to or better able to respond successfully to, unforeseen environmental changes”. (p. 10) “Flexibility can be seen as a characteristic of an organization that makes it less vulnerable to unforeseen external changes or puts it in a better position to respond successfully to such a change (p. 42).”
Ansoff (1965)	“Flexibility can be measured by two proxy objectives: external flexibility achieved through a diversified pattern of product- market investments, and internal flexibility through liquidity of resources” (p.65); “not putting all of one’s eggs in a single basket” (p.65)

(Source: Adapted from “Defining Strategic Flexibility”, Norman Roberts, Gary J. Stockport (2009), *Global Journal of Flexible Systems Management*, Vol. 10, No. 1, p27

### 2.3.2 Organizational Flexibility

The 21<sup>st</sup> century organizations are horizontal and look like web, where various forms of collaborations exist between partners, suppliers, contractors, employees and customers, who are becoming more independent. Tomorrow’s organizations are likely to be highly virtual and able to organize information, independent contractors and suppliers worldwide, and acquire knowledge. To succeed in new era, organizations will need to attract and retain best talent (Amor, 1999, Aalst, 2000).

Today’s highly volatile and competitive market put added pressure on organization’s rapid adaptation and high level performance. In a flexible

organization, more importance is placed on possessing dynamic resources and ability for rapid action and decision-making. Organizational flexibility also involves flexibility in alliances and collaborations (Duysters et al., 2000). In an era of rapid technological changes and turbulent markets, organizational flexibility is getting importance and key requirement is process flexibility (Stohr et al., 2008). Organizational flexibility is adaptability to exploit future opportunities. Organization must detect changes in environment and apply novel responses to accommodate these changes.

According to Phan (2001) organizational flexibility is imperative for its survival. Flexible organization should create the following: (i) a responsive internal environment to be created, which quickly react to any changes in market place, planned or unforeseen, a threat or an opportunity; (ii) a variable cost dominated structure to manage costs in situation of growth, recession or change in demand; (iii) focus on core and profitable activities; and (iv) a resilient infrastructure, which is available round the clock and around the world.

The more dynamic (frequency and intensity of environmental changes), complex (number and relatedness of environmental changes), and unpredictable the environment (extent to which cause and effect relationships are incomplete), the more difficult to handle the managerial and organizational design tasks (Volberda, 1992). The degree to which an organization has variety of managerial capabilities, and the speed at which they can be activated, to increase the control capacity of management and improve the controllability of the organization (Volberda, 1996).

### **2.3.3 Operational Flexibility**

In a turbulent environment, firms are increasingly confronted with uncertainty and consequences of their actions are less predictable. This necessitates flexibility in the organization (Krinjnen, 1979). Operational flexibility encompasses structure, process and people of an organization where operations are planned, processed and executed. As a consequence of temporary fluctuation in demand for products or services, organization should be able to react efficiently to changes in production volume/ service. It require adaptation more regularly at operational level. Oliver (2001) explains that customer data must be integrated with different databases and applications for customer service applications.

The manufacturing agility has been equated with performance in terms of high variety, low cost, high quality products, with short lead times in varying lot sizes, built to individual customer requirements (Vokurka and Fliedner 1998, Upton 1995). While manufacturing flexibilities have been associated in general with improved agility and the ability to contend with environmental instabilities (Upton 1994) and ability of a manufacturing system to change states across an increasing range of volume and/or variety, while adhering to stringent time and cost metrics (Upton 1994, Swamidass 1988), it can be achieved by concurrent investments in human and organizational factors are required (Jaikumar 1986, Upton 1995).

For operational flexibility, shift in relationship between organization and its environment is not substantial. The changes in the organization are familiar and lead to temporary activity level change, which require operational flexibility (Volberda, 1998). Toni and Tonchia (2005) have described the linkage between strategic flexibility and operational flexibility. At corporate level,

strategic flexibility evaluates the changes in business while operational flexibility estimates the variance of competence. At business level, strategic flexibility measures the effect on performance, while operational flexibility estimate the variation of practices. Operational flexibility for manufacturing (Oberoi et al., 2007) is given in Table 2.4.

**Table 2.4: Flexibilities at Strategic, Tactical and Operational level**

<b>Level</b>	<b>Flexibility Dimensions</b>	<b>Author (s)</b>
Strategic Flexibility (Organization Level)	New product flexibility	Brown et al.(1984), Grewin (1987, 1993), Taymaz (1989), Gupta and Somers (1996)
	Market/ Delivery flexibility	Sethi and Sethi (1990), Grewin (1993), Narsimhan and Das (2000), Narsimhan (2004)
Tactical Flexibility (Plant level)	Product Mix flexibility	Brown et al. (1984), Grewin (1993), Gupta and Somers (1996)
	Volume flexibility	Slack (1983), Brown et al. (1984), Sethi and Sethi (1990)
	Modification flexibility	Grewin (1993), Koste and Malhotra (1999)
Operational Flexibility (Shop level)	Material flexibility	Grewin (1987,1993)
	Equipment flexibility	Brown et al. (1984), Carter (1986)
	Routing flexibility	Brown et al. (1984), Grewin (1987,1993)
	Material handling flexibility	Sethi and Sethi (1990), Gupta and Somers (1992)
	Program flexibility	Sethi and Sethi (1990), Gupta and Somers (1992)

*Source: Oberoi et al. (2007), Global Journal of Flexible Systems Management, Vol. 8, No. 3, p 1*

### **2.3.4 Information System Flexibility**

Technology is not only the means of production but it is now a main component of service, and collaboration and is one of the primary forces in emergence of new economy. Technical flexibility provides flexibility of technology platform related to business processes and thus more freedom of choices to the organization to quickly adapt to the changing market environment. Information technology can be used by the organizations as a resource to gain competitive advantage (Clemons, 1991).

Information system (IS) flexibility has several dimensions such as compatibility, functionality, data transparency, connectivity, technical and functional skill and technology management. It is positively correlated with mass customization, market position and innovativeness of the organization (Byrd and Turner, (2001)). Technological flexibility is linked with product and service flexibility by using open system (Gronhaug, 1999). Information system flexibility in terms of processing power, data storage capacity, integration standards and network capacity provide integration of e-business with existing brick-and-mortar infrastructure (Malhotra, 2001). Flexible e-business infrastructure can directly influence size and nature of customer, partners, suppliers, competitors and products and can have huge impact on market and profitability. Real-time information use will increase number of business processes, flexibility and adaptability, which is fundamental requirement of today's and tomorrow's business (Davidson, 1999). An efficient and effective e-business model can be achieved by integrating business applications and data among customer, supplier, employees and partners. Open standard-based infrastructure allows existing application functionality to integrate with new application logic (Shi and Daniels, 2003).

Ramaraj (2010) has presented conceptual models, which will help to assess the capability of an information system to respond to technological and business changes, to identify dimensions of information system flexibility and to measure it, and to develop managerial guideline for information system flexibility management. Stakeholder flexibility due to e-business has been studied in the context of an auto company (Dwivedi, 2003). The key to success in the new economy are; data, information, knowledge, interaction, technology, trust, and the relationship but flexibility provides business sustenance in face of

dynamic and unpredicted environment. The flexibility for stakeholders from business and from business to stakeholders in e-business environment has been examined.

## **2.4 Identified Research Gaps**

Enterprise performance management has grown from singular dimension to multi-dimensional in recent years. Dimensions and perspectives of measurement have incorporated financial, customer, vendor, employee, internal business process, strategic alignment, and strategic monitoring. The implementation of EPM has resulted into organizational effectiveness in terms of focus on important aspects of business, improvement of business, customer satisfaction, productivity, employee satisfaction, culture, and company reputation, alignment of operation with strategy, break-through performance, and organizational transformation.

Globalization and liberalization has increased turbulence in external environment and consequently there is a high degree of uncertainty and risk associated with business. Organization need to manage these uncertainties and hence various types of flexibilities such as strategic, organizational, operational, functional, manufacturing, external, internal, and information system flexibilities needs to be incorporated to remain competitive in today's environment.

There are few gaps found in literature on enterprise performance management. The available literature lacks in comprehensiveness, integrated approach covering complete cycle of performance management, its linkages,

and effect of implementation issues and critical success factors on effectiveness of EPMS in driving performance improvement in the organization.

From the literature review, following research gaps are observed:

- (i) Many studies highlighted various dimensions and linkages on enterprise performance management system but an integrated study covering strategy planning, strategy implementation, EPMS design, and performance reporting and feedback has been lacking to assess EPMS effectiveness.
- (ii) Some models included flexibility but strategic flexibility and information system flexibility as a core driver of EPMS effectiveness is almost missing.
- (iii) EPMS implementation issues and their effects have been examined in some studies but an integrated study on role of implementation issues and key success factors incorporating flexibility is lacking.
- (iv) An empirical validated framework with an integrated approach on EPMS incorporating strategy planning, strategic flexibility, strategy implementation, EPM system design, information system flexibility, performance reporting and feedback, EPMS implementation issues and key success factors for effectively driving performance improvement in organization is not available.

## **2.5 Concluding Remarks**

The available review of literature suggests that the traditional concepts of EPMS are fast changing and giving way to new concepts which are more comprehensive, integrated, focussed and aligned.

This shift can be attributed to fast changes like globalization of business, advancement in technology and increase in competition. These changes have made the business environment more dynamic and uncertain, necessitating incorporation of flexibility. EPMS implementation issues affecting the success have also been incorporated as influencing factor.

Based on review of literature, the evolution of research design, conceptual model, research hypotheses, and methodology is presented in the next chapter.

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