

Development of performance measurement framework for SMEs

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Abstract

The purpose of the performance measurement is to evaluate the performance of a company in the competitive business environment. Performance measurement plays a vital role to improve the performance of the company by identifying an obstacle in the system. In the present work, Performance measurements mainly focus on the customer, internal business process, learning, and financial perspective. In the turbulent business environment, Small-medium enterprises (SMEs) are facing many problems due to frequent changes in the economic policy by the government. Due to Low cost, better service, good market reputation and competitors in the supply chains of the companies forces to the organization to improve the performance level of the company. There is a various tool like a Balanced scorecard, SCOR model and web based card available which effectively measure the performance of the company. In this paper, we have been used the balanced scorecard to measure the performance of the small-medium enterprises.

Keywords: Balanced scorecard, SCOR model, SM

INTRODUCTION

Performance measurement of manufacturing firm has vital role in the improvement of performance. Performance measurement evaluates the company profile in globalization market. It has two part to measure performance one is financial and other is non financial. Top management needs financial measure for management level decisions but lower management and workers need operational measure for daily business. There are various methods to measure performance measurement. Balanced SCOR card and SCOR model is popularly used in the performance measurement. Performance measurement in the area of cost, quality, environmental, customer service, learning and innovation are versatile used in the manufacturing firm. Environmental sustainability is the important area in the manufacturing firm. Consumers, government, business leader focus on the reducing green house gas emission. The demands of product and service change time to time for maintain green sustainability. Ultimately green supply chain management is the objective of an effective supply chain environmental performance system. The reach of GSCM extends across the organization and trading partners, and includes the process involved in purchasing, manufacturing, distribution and reversed logistics. Automaker General Motors, for example, plan to reduce its energy use worldwide by 10 percent by 2020. They use internet system that receive, validates and stores energy use data, tracks billing accuracy and allow users to monitor the usage and cost data through various tracking tools. Nissan has recently announced their Nissan green program 2020, which focus on reducing carbon dioxide emission and exhaust emission, and focus on recycling efforts throughout the supply chains.

While global manufacturing has been on the rise, it continues to presents companies with difficulties - managing a network of interlinked sites focus on common goals remains challenging (Rudberg and West, 2008). The task of manufacturing managers is complex They need to decide on the overall vision for the network and derive goals and objectives for each plant (Vereecke et al., 2008). To do so, they have to understand the environment, customers and regions the company operates in. To complicate the matter, the vision and goals of today might prove to be outdated or wrong tomorrow: Managers of global operations also need to understand the dynamism of manufacturing on a global scale. They need to be able to reconfigure manufacturing networks in response to new circumstances or arising business opportunities. Another challenge for manufacturing networks lies in their origin. More or less autonomous, regionally responsible full scale manufacturing sites have been developed into an interlinked network of focused plants with unique knowledge. This trend is expected to further increase as companies need to utilize their intellectual capital wherever it resides. In these interlinked networks, the focus and understanding of manufacturing site performance shifts from an operative and output-oriented understanding with a strong cost focus towards a networking understanding that requires multiple non-financial performance measures to capture the diverse aspects of manufacturing network performance. However, not all manufacturing sites within a network are able to contribute equally to the achievement of network level goals; their contribution will depend on their size, competences, equipment and resources. To fully realize the potential of a manufacturing network, it should be managed as a whole, in accordance with its site roles. In general, managers frequently use performance measurement systems (PMS) to put strategy into action. However, contemporary business management and performance measurement literature often fail to take into account two important facts Firstly, manufacturing sites can adopt different roles within a manufacturing network. Secondly, within a business organization, different types of manufacturing processes, which may yield different results, might be in use at the same time.

Performance measurement systems (PMS) are sets of performance measures as following

- a) It consists of a structural framework which contains performance dimensions and a procedural framework which describes a process to derive the measures used in the PMS.
- b) It can incorporate objective and subjective measures. it can incorporate qualitative and quantitative measures, the content and scope of PMS depends on their assumed role.
- c) It can take over different roles in an organization.
- d) Performance Measurement is a learning tool rather than solely a measurement tool.
- e) A performance management system is the meta-system above the PMS. It is used to develop, communicate, implement and re-evaluate a PMS.PMS should be aligned to strategy.PMS should incorporate financial and non-financial measures.
- f) Performance should be understood as a multi-dimensional domain.
- g) A PMS should incorporate the perspective of multiple (external) stakeholders.
- h) A PMS needs to be linked to the different corporate systems and functions.
- i) A PMS needs to fit to the organizational structure of an organization.
- j) Social aspects play an important role in the implementation of PMS
PMS should be integrative and people from multiple organisational levels should be incorporated in the development and implementation of PMS

Requirements and Guidelines for Performance Measures are as following

It should be simple to understand and relevant.

- a) It should be derived from strategy.
- b) It should support each other and form and integrated entity.
- c) It should focus on/enable improvement.
- d) It should be re-evaluated and eliminated if not needed.
- e) It should provide timely and accurate feedback.
- f) It should be based on quantities that can be influenced, or controlled, by the entity evaluated.
- g) It should reflect the business process - i.e. both the Vendor and customer should be involved in the definition of the measure.
- h) It should relate to specific goals (targets). It should fit to a company's culture.
- i) It should employ ratios rather than absolute numbers.
- j) It should be part of a closed management loop.
- k) It should be visible to everyone involved

There are many management frameworks for performance management of manufacturing firm. In present scenario Balance SCOR Card is one of the best performance management frameworks that is described below.

Balanced SCOR card

The balanced SCOR card is a strategic planning and management system that is used extensively in business and industry, government, and non-profit organizations worldwide to align business activities to the vision and strategy of the organization, improve internal and external communications, and monitor organization performance against strategic goals. It was originated by Dr Robert Kaplan (Harvard Business School) and David Norton as a performance measurement framework that added strategic non-financial performance measures to traditional financial metrics to give managers and executives a more 'balanced' view of organizational performance. While the phrase balanced SCOR card was coined in the early 1990s, the roots of the this type of approach are deep, and include the pioneering work of General Electric on performance measurement reporting in the 1950's and the work of French process engineers (who created the Tableau de Bord – literally, a "dashboard" of performance measures) in the early part of the 20th century.

The balanced SCOR card has evolved from its early use as a simple performance measurement framework to a full strategic planning and management system. The new balanced SCOR card transforms an organization's strategic plan from an attractive but passive document into the "marching orders" for the organization on a daily basis. It provides a framework that not only provides performance measurements, but helps planners identify what should be done and measured. It enables executives to truly execute their strategies. This new approach to strategic management was first detailed in a series of articles and books by Dr Kaplan and Norton. Recognizing some of the weaknesses and vagueness of previous management approaches, the balanced SCOR card approach provides a clear prescription as to what companies should measure in order to 'balance' the financial perspective.

The balanced SCOR card is a management system (not only a measurement system) that enables organizations to clarify their vision and strategy and translate them into action. It provides feedback around both the internal business processes and external outcomes in order to continuously improve strategic performance and results. When fully deployed, the balanced SCOR card transforms strategic planning from an academic exercise into the nerve centre of an enterprise.

4.1 web-based SCOR card

Today, a number of software applications are available to design SCOR cards, which also link via the web to a firm enterprises software system. Web based balanced SCOR card application is also some time referred to as dashboards. These enables users to retrieve data easily from enterprises resources planning (ERP) databases and also enable wide access by users at many location. Use of these web-based SCOR card provides managers to see real time progress towards organizational milestones and help to ensure that decision remain in sync with firm overall strategies.

4.2 SCOR MODEL

One of the more recognized methods for integrating supply chains and measuring trading partner's performance is the use of supply chain operation reference (SCOR) model developed in 1996 by supply chain consulting firm's Pittiglio Rabin to dd& Macgrath. These firm are also founded the supply chain council, a nonprofit global organization currently with membership of approximately 1000 firms, to manage the SCOR model. The SCOR model integrates the operation of supply chain members by linking the delivery operations of the seller to the sourcing operations of the buyer. The SCOR model is used as a supply chain management diagnostic, benchmarking, and process improvement tool by manufacturing and service firms in the variety of industries around the globe. Some of the more notable firms to have using the SCOR model include Intel, IBM, 3M, Siemens, and Bayer.

The SCOR model separates supply chain operation into five categories- plan, source, make, deliver and return.

- a) PLAN- demand and planning including balancing resources with requirement , establishing/communicating plan for the supply chains, management of business rules, supply chain performances, data collection, inventory, capital assets, transportation and regulatory requirements.
- b) SOURCE- sourcing stocked, make to order, and engineer to order products including scheduling deliveries, receiving, verifying and transferring product, authorizing Vendor payments, identifying and selecting Vendors, assessing Vendor performance, managing incoming inventory and Vendor agreements.
- c) MAKE- Make to stock, make to order, and engineer to order production execution including scheduling production activities, producing, testing, packaging, staging, and releasing product for delivery, finalizing engineering for engineer-to-order-product, managing work in process, equipment, facilities and the production network.
- d) DELIVER-Order, warehouse, transportation, and installment management for stocked, market to order product including all order management steps from order inquiries and quotes to routing shipments and selecting carriers, warehouse management from receiving and picking to loading and shipping product, invoicing customers, managing finished product inventory and import/export requirement.
- e) RETURN- Returns of purchased materials to Vendor and receipt of finished goods returns from customers including authorizing and scheduling returns, receiving,

Verifying, and disposing of defective and excess products, return replacement or credit, and managing return inventories.

Implementing SCOR model is no simple task and require significant amount of time and communication with the firm and among supply chain partners. But the firms who use the model find it very helpful. For instance, Mr. joe Williams, Director of global productivity at Mead Johnson Nutritional, a division of Bristol-Myers Squibb, says the SCOR model is playing a big role in helping their unit measure its supply chain performance against another company. But getting those measurements "is a big job".

The SCOR model is used to describe, measure, evaluate supply chain configurations. The model is design to enable effective communication, performance measurement, and integration of process between supply chain partners. A standard reference model help focus on the management issues, serving internal and external customers, and instigate improvement along the supply chain. Using the SCOR software, virtually any supply chain can be configured, evaluated, and benchmarked against best practices, leading to continuous improvement and sustainable competitive advantage for the supply chain practices partners. SCOR mark is the newest tool of supply chain council, which allows member firm to benchmark against peer companies, using a bench marking portal at the supply- council website.

Sustainability of the manufacturing firm

Sustainability criteria for the manufacturing firm are financial, non-financial, material, natural resources, health and safety, human capabilities and ethics. Further sustainability is sub-divided into short-term, medium-term and long term sustainability. Short term sustainability is called operational, medium term sustainability is called tactical and long term sustainability is called strategic. Financial provider and 3rd party logistics provider play vital role in downstream activities and upstream activities respectively. Stakeholder and government play major role in making sustainability. In the upstream activities supplier play important role and downstream activities company play important role. Internal activities operation is done in the company. 3rd party logistic provider is directly link with the supplier and company. Financial provider is directly link with the supplier, company and customer.

With the help of financial provider all supply chain operation is smoothly run. Stakeholder play prominent role in the company decision. For local communities company spent some financial fund for the communities' development. Governments make mutually relationship with the company. Government makes new economic policy by which companies operation internally and externally become smooth. Sustainability divided into three category short-term sustainability, medium-term sustainability and long-term sustainability. Short-term sustainability is called operational for which decision taken by supervisor level work-man. Medium-term sustainability is called tactical and long-term sustainability is under strategic. For measuring sustainability of the manufacturing firm we measure various criteria financial, non-financial, material, natural resources, energy, health and safety, human capabilities and ethics .Company level considers activities of focal company. This level does not engage with any external group or companies.

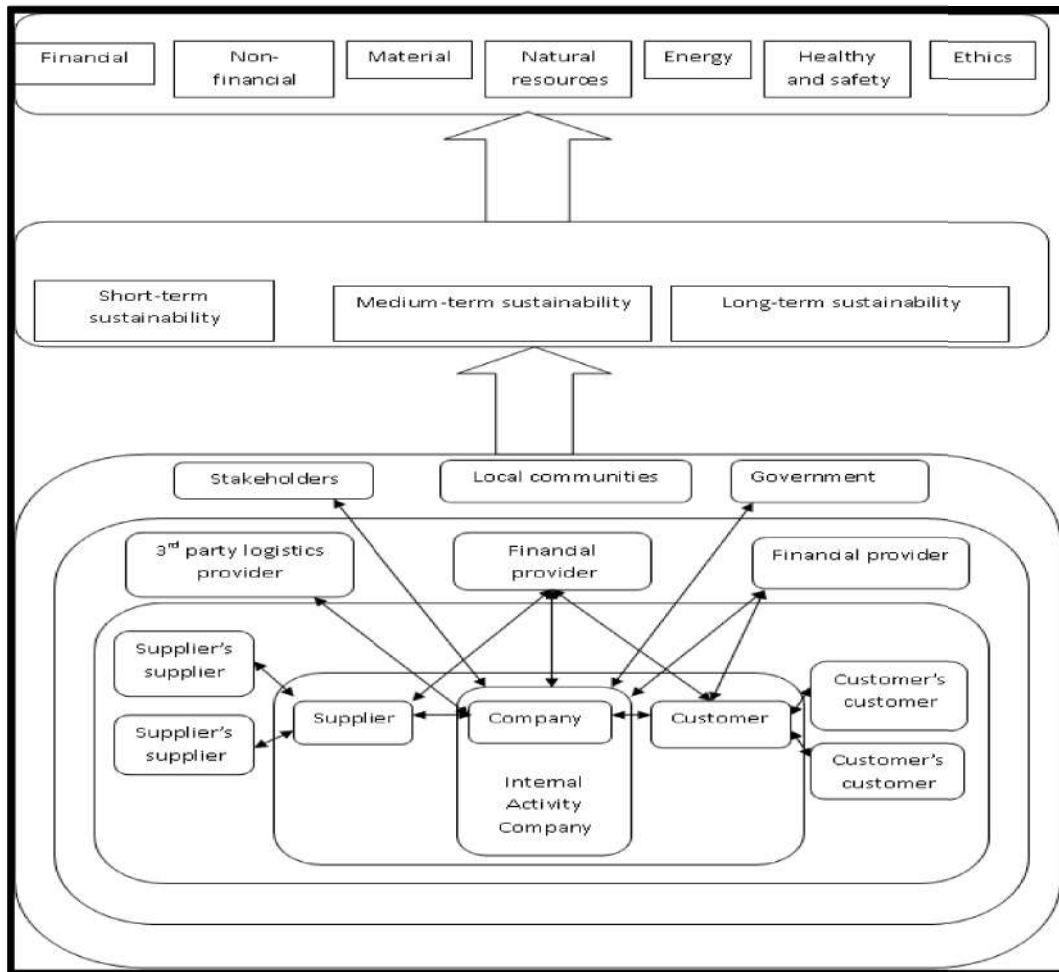


Figure 1 Sustainability of the manufacturing firm

- Direct supply chain considers activities undertaken to create opportunities for negotiation, consultation, or simply exchange of information between company and the first tier supply chain.
- Extended supply chain considers activities in the direct supply chain and includes activities among Vendor to the customers. It does not consider logistics and financial provider.
- Ultimate supply chain activities within the extended supply chain and financial and logistics providers. Stake holder activities undertaken to create opportunities for negotiation, consultation or simply exchange of information between company and stake-holder.

6. Performance Measurement and Management in Manufacturing Networks

As companies increasingly compete in international markets, so increases the difficulty of setting a strategy that adequately addresses all markets and accordingly it becomes more difficult to derive appropriate manufacturing goals and performance dimensions. Further to these strategic dilemmas, implementing a performance measurement system is complicated by the practical problems that come along with a global spread of manufacturing activities. These problems are:

- Decentralized operational reporting history.
- Deficient insight in the cohesion between metrics.
- Poor communication between users and producers of performance measures.
- A dispersed IT infrastructure.

Additionally, companies increasingly manufacture in networked structures such as supply chains, inter organizational networks and intra organizational networks, but implications of those networks on performance and performance measurement have not yet been fully understood. Performance measurement in manufacturing networks has not been discussed sufficiently in the scientific literature. In particular, the literature lacks a comprehensive discussion of the implications of different types of network coordination and configuration on performance and performance measurement. A framework that illustrates the interdependencies between capabilities on site and on network level, and the overall competitive advantage generated by a manufacturing network. This overall competitive advantage is considered as the performance of the manufacturing network. Performance on site level refers to operational performance on site level as described by the competitive priorities which result in a competitive advantage. Performance on network level refers to the quality of coordination and configuration of the manufacturing network which results in a competitive advantage. Capabilities on network and site level can offset one another. However, their case study-based approach is purely qualitative, and so is their assessment of performance/capability on site and network level. It focuses on the interdependencies between network configuration and the volatility of firm performance. Firm performance is described as the quotient of earnings before interest and taxes (EBIT) and total assets. Although considers the impact of different types of network configuration on performance, the types of considered configurations are only defined superficially, without incorporating detailed trends and definitions from recent literature on manufacturing networks. Furthermore, does not discuss what constitutes performance on a manufacturing network level.

The two approaches to performance in the context of manufacturing networks point out another dilemma in the scientific literature: There is no unified definition of manufacturing site performance and hence manufacturing network performance. Addressing the aspect of collaboration and reaching goals defined above site level is especially important in an intra-organizational environment, as collaboration within intra-organizational relationships is generally lower than in inter-organizational relationships. It point out that the definition of network and site performance and the task of network development should not be left to sites alone, but should be steered from a central entity in a top-down process. Additionally, the definition of site and network level performance and the embedding into a network level performance measurement system allow the realization of network level goals and help align strategies throughout a network. A strategic performance measurement system can therefore be used to put strategy into action. The internal alignment of strategy is important as it positively correlates with external market and business performance.

Perspectives on performance differ depending on the different domains or responsibility areas that are assessed. It is therefore impossible to transfer concepts regarding, e.g., R&D performance straight to a manufacturing environment. Similarly, supply chain performance does not automatically incorporate all aspects of manufacturing network performance as discussed in this dissertation. In a supply chain context, performance has traditionally focused on logistics performance. However, as highlighted in this section, performance aspects extend beyond logistical matters in the context of manufacturing networks. performance straight to a manufacturing environment. Similarly, supply chain performance does not automatically incorporate all aspects of manufacturing network performance as discussed in this dissertation. In a supply chain context, performance has traditionally focused on logistics performance. However, as highlighted in this section, performance aspects extend beyond logistical matters in the context of manufacturing networks. Performance Measurement Systems that are suitable for supply chains and logistics networks can therefore not be used in the context of manufacturing networks. Another problem with existing PMS lies in their general focus on financial performance measures which is not suitable for a manufacturing environment since manufacturing site and network performance are a complex construct which should incorporate multi-dimensional performance dimensions and measures.

The productivity of manufacturing sector of a nation is affected by various factors like the skill level of its production work forces, level of technologies, the availability of resources, the infrastructural development level of the country and many other factors. In dealing with firm productivity, the most common factor included by many researchers is the human capital variables measured by education level, training, educational expenditure, literacy rate and so forth. Human capital attainment especially in terms of education and training plays an important role in determining firm's performance such as output, productivity and profit (Honig 2001, Blundell et al. 1999, Barron et al. 1989, Blakemore and Hoffman 1988). Mason and Finegold (1997) in the United States and Britain support the positive relationship between human capital and the firm's performance. They found that education and training are more important determinant of productivity as compared to physical capital. Firms with more educated workers are better able to sustain and control their present technology or adopt modern and new technology. They are more able to invest in human capital like training because knowledgeable workers learn and adapt faster and are more innovative (Bosworth and Wilson 1993, Bishop 1994 and Chapman and Tan 1990). Rahmah (2000), Labor productivity is very much related to skills among workers that can be acquired through Proper training.

Table 1 Customer perspective

Objective	Measure	Target	Initiative
Satisfactory customers experience	Growth of sales (current 16%)	17% by 2018	Improve the customer service through employee trainings
Maintain existing customer satisfaction level	By customer survey	Maintain as 84% by 2018	By reducing lead time by better vendor selection

Table 2 Internal Business Process perspective

Objective	Measure	Target	Initiative
Lowering the Production Cost	Marginal Cost	decreased by 5% by 2018	Outsource more types of non critical item at lower cost at desired quality
Green supply chain	Save energy and eco-friendly store Use biodiesel fuel	reduce energy consumption by 10% by 2018 use 8% biodiesel fuel by 2018	1. Implementing an eco-friendly management model in their shops, 2. Training for awareness campaigns such as limiting energy consumption 3. Cardboard and plastic used for packaging are recycled. reduce their CO2 emissions by 5 tons

Table 3 Learning and innovation

Objective	Measure	target	Initiative
Employee Training & welfare	Employee Turnover (current 23%)	decreased by 20% by 2018	Training to enhance good communication between managers and employees
	lead time for assembly of product (current 02 weeks)	1 week and 04 day by 2018	Training to Design for manufacture
	Employee Turnover (current 23%)	decreased by 20% by 2018	Training to enhance good communication between managers and employees

Table 4 Financial perspective

Objective	Measure	target	Initiative
Financial sustainability	Measure	Target	TQM, Lean, Kaizan
	PAT growth (current 13.47%)	15% by 2018	
	ROE (current 27.91%)	29% by 2018	
	Net profit margin (current 14.84%)	16% by 2018	
	Total Asset Turnover (current 1.23)	1.3 by 2018	
	Inventory turnover (current 24.62)	26 by 2018	
	Current ratio (current 1.51)	1.65 by 2018	
	Quick Ratio (current 1.45)	1.55 by 2018	
Net Income Growth (currently 22%)	24% by 2018		

Table 5 Data of parameters for the performance measurement of XYZ Ltd.

Parameter	Sub-parameter	Mar-16	Mar-15	Mar-14	Mar-13	Mar-12
Performance Ratios	ROA(%)	0.46	-9.51	0.66	0.57	2.29
	ROE(%)	1.26	-27.88	1.75	1.57	6.32
	ROCE(%)	4.4	-6.73	0.93	4.39	7.2
	Asset Turnover(x)	0.91	0.79	0.74	0.93	1.09
	Sales/Fixed Asset(x)	1.41	1.3	1.35	1.89	2.53
	Working Capital/Sales(x)	-6.62	-3.35	-3.13	-4.5	-7.03
Efficiency Ratios	Fixed Capital/Sales(x)	0.71	0.77	0.74	0.53	0.4
	Receivable days	10.5	10.76	14.67	16.75	16.37
	Inventory Days	37.97	40	40.2	33.46	26.13
	Payable days	41.29	42.41	43.86	36.71	30.11
Valuation Parameters	Enterprise Value/Net Sales(x)	3.46	5.43	4.17	2.28	1.87
	Enterprise Value/Core EBITDA(x)	32.96	306.24	48.69	26.93	21.37
	Enterprise Value/EBIT(x)	89.86	-83.45	436.93	65.43	39.67
Growth Ratio	Net Sales Growth(%)	16.72	5.87	-23.41	-17.57	15.33
	Core EBITDA Growth(%)	590.83	-78.08	-22.63	-20.1	-6.61
	EBIT Growth(%)	169.04	-821.8	-79.05	-38.95	-28.51
	PAT Growth(%)	104.94	-1516.64	10.84	-75.7	-31.44
	EPS Growth(%)	104.69	-1516.67	9.85	-75.83	
Financial Stability Ratios	Total Debt/Equity(x)	0.71	1.42	0.79	0.88	0.82
	Current Ratio(x)	0.6	0.42	0.36	0.48	0.62
	Quick Ratio(x)	0.33	0.19	0.15	0.27	0.41
	Interest Cover(x)	1.1	-1.47	0.24	1.13	2.1
	Total Debt/Mcap(x)	0.12	0.12	0.12	0.2	0.18

There is various dimensions to measure performance measurements like as performance ratio, efficiency ratio, valuation ratio, growth ratio and financial stability ratio. In performance ratio there is various parameter are included like as Return on assets, return on equity, return on capital employed, Assets turn-over, Sales versus fixed cost and working capital versus sales. Return on asset indicates company profitable in the annual term. Return on asset is defined as total earnings in annual divided by total assets. It is normally expressed as a percentage. Return on equity measure how much company makes profit by each rupee of shareholder equity. Return on equity is defined as Net income divided by total shareholder equity. It is also expressed as Return on net worth. Return on capital employed measures the efficiency of capital utilized of the It also indicates company profitability. ROCE is the ratio of Net income worth before tax and interest. Capital employed is the sum of shareholder equity and debt liabilities. Asset turnover measures the efficiency of utilization of company asset. Company with low-profit margin tends to high asset turnover.

Asset turnover is the ratio of Net sales revenue and total average assets. Sales versus fixed asset are the ratio of Net sales and to the fixed asset. A fixed asset is the value of building, land, and equipment. This ratio is normally expressed as the how much company make a profit by fixed capital asset and expressed that how much importance of the fixed asset to gain sales revenue. Working capital versus sales indicates that how much sales turnover gain by expensing the working capital. The working capital turnover ratio analyzes the relationship between the money funds the operation and generate the money by funding. Payable days are generally average payable period. A payable day tells how long company takes to pays its Vendor. Inventory days is defined as no of days to take sell all inventory. In other words, we can say the number of the day take to sell the current inventory. Inventory days plays a vital role in the profitability of the company. A receivable day is the no of days to receive current debt liabilities. Fixed capital versus sales is an important factor to determine the profitability of the company. A fixed asset is generally asset which is not involved in the operation. Fixed capital is the portion of total capital outlays which is involved in land, building, equipment, vehicles etc.

Third important parameter is valuation parameter. There is various sub –parameter in valuation parameter like as Enterprises value versus Net sales, Enterprises value versus EBITDA, Enterprises value versus EBIT. Enterprises value versus sales measures the compare the enterprise's value of the company to the company sales. Enterprises value is the basically the sum of stocks, market value of equity, the market value of debt, minority interest. Enterprises value versus EBITDA measure basically returns on investment. Enterprises value mentioned above and EBITDA is earnings before interest, taxes, depreciation, and amortization. Enterprises value versus EBIT means that what is a company valued per each dollar of EBIT. EBIT is basically earned before interest and taxes. High EV/EBIT value means the company is overvalued. Low EV/EBIT value means the company is undervalued.

The fourth parameter is growth ratio. In growth ratio, there is various sub parameter like as Net sales growth, core EBITDA growth, PAT growth, EPS growth Net sales growth is an increase in the percentage of sales compared to a previous fiscal year. Core EBITDA growth is also increasing in earnings before interest, taxes, depreciation, and amortization compared to a previous fiscal year. EBIT growth is also increasing in earnings before interest and taxes compared to a previous fiscal year.

MANAGERIAL IMPLICATION

In the present research balanced scorecard approach is effective for the performance measurement in the supply chain of the industry. The model developed to attempt to suggest how the balanced scorecard is useful for performance measurement. The objective of this research was to develop various perspectives that would help to performance measurement in the supply chain of the industry.

CONCLUSIONS

Performance measurement of manufacturing firm has a vital role in the improvement of performance. Performance measurement evaluates the company profile in globalization market. It has two part to measure performance one is financial and other is non-financial. Top management needs a financial measure for management level decisions but lower management and workers need an operational measure for daily business. Balanced scorecard approach has been used for measuring the performance measurement of the SMEs.

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