

# UPNEC Performance Management System using the Balanced Scorecard

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**Abstract**— The University of the Philippines National Engineering Center (UP-NEC) has been mandated through P.D. 1295 to fortify the country's continuing efforts at national development. In order to achieve this, the UP-NEC aims to provide technical training to ensure a steady and expanding supply of technical manpower with expertise in the various fields of technology and engineering; as well as, to develop technologies for the sustainable utilization of indigenous resources that address the needs of the local industry. In pursuit of this mandate, UP-NEC applied for and was awarded the Philippine Quality Challenge (PQC) Level 1 in 2012 and the Philippine Quality Award (PQA) Level 1 in 2016. PQA is not only a national recognition for exemplary performance, it also stimulates local companies and organizations to improve quality and productivity in fulfilling its mandate and its vision to be the HUB of Engineering Innovations and Technology.

The findings and recommendations from the PQA Team of Assessors identified UP-NEC's strengths as well as opportunities for improvement. With the assessment, it was deemed that a more strategic performance assessment is needed to ensure that UP-NEC is able to fulfill its mandate and its vision. The Balance Scorecard was chosen as the performance measurement and strategy management system to align its strategic objectives of Service, Reach and Self-sufficiency with the attainment of goals for the employees and partners, effective internal processes, service to its clients and stakeholders as well as financial sustainability.

The study discusses the National Engineering Center's (UP-NEC) proposed Balanced Scorecard strategies and initiatives to attain its strategic objectives and move towards being a true hub of engineering innovations and technology in support of the country's continuing efforts at national development.

**Keywords**— *National Engineering Center, Balanced Scorecard, Phil. Quality Award*

## 1. INTRODUCTION

The University of the Philippines National Engineering Center (UP-NEC) established on January 27, 1978 through P.D. 1295 aims to fortify the country's continuing efforts at national development, with the principal objective of accelerating industrial growth in the Philippines. To achieve this, UP-NEC's mandate is to (1) develop technologies for the sustainable utilization of indigenous resources that address the needs of the local industry, and (2) ensure a steady and expanding supply of technical manpower with expertise in the various fields of technology and engineering.

To ensure UP-NEC's sustainable support towards national development, the Center must sustain consistent quality performance in providing professional engineering training and advisory services to industry, government and the academe. The necessary infrastructure must be established to ensure the monitoring and control of its service offerings and its impact on national development.

With the recent UP National Engineering Center's Philippine Quality Award (PQA) recognition for Commitment to Quality, the Center needs to put in place a performance measurement system that will promote proficiency in quality and lead it towards mastery and the achievement of The Philippine Quality Award. This performance measurement system must be able to map the Center's activities and

initiatives against its strategic objectives towards the fulfillment of its mandate, align with the goals of national development and measure its impact on Philippine Society.

### *1.1 Objectives of the Study*

The study was done to address the identified Opportunities for Improvement (OFI) resulting from the UP National Engineering Center's application and awarding of the Philippine Quality Award (PQA) Level 1. One specific concern was how UP-NEC will fulfill its Vision to become the hub of engineering innovations and technologies. A review of available performance management frameworks such as the Performance Prism (Neely, Adams & Kennerley, 2002), the Balanced Scorecard (Kaplan and Norton) and the Performance Pyramid (Lynch and Cross) was done. The Balanced Scorecard was selected on the basis of it being more holistic in its approach and gives weight to the value of the employees and delivery partners of the organization in achieving organizational success.

### *1.2 What is the Balanced Scorecard*

The Balanced Scorecard was introduced by Dr. Robert Kaplan and David Norton in 1992 as a management tool that allow organizations to measure and monitor performance of both their tangible and intangible, financial and non-financial assets. Since the publication of their article in the 1992 Harvard Business Review, thousands of companies from various industries have adopted the Balanced Scorecard as their performance measurement and strategy management system.

The Balanced Scorecard monitors organizational performance from four (4) perspectives – financial, customer, internal processes and learning and growth perspectives. These four perspectives are believed to be drivers for creating long-term shareholder value. It links employee development and well-being to process efficiency and productivity which increase customer satisfaction and retention which then translate to financial growth. Figure 1 shows the four perspectives and how it puts the vision and strategy at the center. The vision and strategy can be achieved through the process of defining the Strategic Objectives, developing the Strategy Map, defining the performance measures and targets and selecting the Strategic Initiatives to achieve the goals.



**Figure 1.** The Balanced Scorecard Strategic Management System (Kaplan & Norton)

## 2. THE BALANCED SCORECARD FRAMEWORK

The Balanced Scorecard Framework from the Balanced Scorecard Institute institutionalized the “Nine Steps to Success”. It follows a disciplined, practical approach to developing a strategic management system based on the Balanced Scorecard. This framework will be used in the proposed UP-NEC Balanced Scorecard implementation. As shown in Figure 2, the nine steps are:

1. Assessment – Mission, Vision, Organization pains, Organization values
2. Strategy – Themes, Strategic Results, Strategies
3. Strategic Objectives – Strategy elements
4. Strategy Map – Performance drivers, enablers and causal effects
5. Performance Measures – Performance measures and targets
6. Strategic Initiatives – Strategic projects
7. Performance Analysis – Performance reporting system and knowledge sharing
8. Alignment – cascade and alignment at the business unit level
9. Evaluation – Performance results and revision of strategies



**Figure 2.** Nine Steps to Success (Balanced Scorecard Institute)

### 3. THE UP-NEC BALANCED SCORECARD

#### 3.1 Assessment

The UP-NEC's quality journey started in 2011 with the overall review of operations and strategies. The Mission and Vision statements were developed and the organizational values were defined.

#### VISION

To be the HUB of Engineering Innovations and Technologies

#### MISSION

To provide and sustain expanding resources of technical expertise, solutions and information in partnership with government, industry and academe for accelerated national development and well-being

#### VALUES

Customer Satisfaction  
Service Excellence  
Innovation  
Professional Discipline

Results Orientedness  
Integrity  
Ownership and Commitment  
Teamwork

An updated SWOT Analysis was also done as shown on Figure 3 below.

<p><b>STRENGTHS</b></p> <ul style="list-style-type: none"> <li>○ The UP Brand</li> <li>○ Breadth and depth of engineering expertise and competencies of resource speakers/consultants</li> <li>○ Industry Connections</li> </ul>	<p><b>WEAKNESSES</b></p> <ul style="list-style-type: none"> <li>○ Lack of marketing efforts</li> <li>○ Changing leadership</li> <li>○ Staff competencies and flexibility</li> </ul>
<p><b>OPPORTUNITIES</b></p> <ul style="list-style-type: none"> <li>○ Government to Government collaborations</li> <li>○ UPNEC as the technical training provider of private companies</li> <li>○ Testing services</li> </ul>	<p><b>THREATS</b></p> <ul style="list-style-type: none"> <li>○ Emergence of other competitors as training providers</li> <li>○ More aggressive and focused consulting companies</li> </ul>

**Figure 3.** UPNEC SWOT Analysis

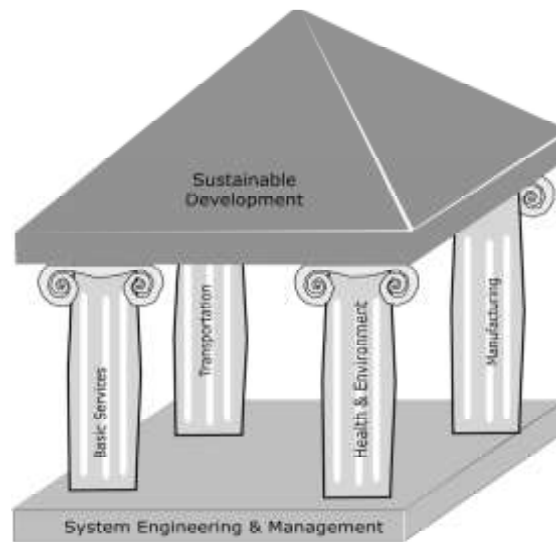
A lot of areas were identified for improvement of operational efficiency and effectiveness. Initiatives were undertaken to improve and standardize process, upgrade facilities and infrastructure, develop partnerships and alliances, streamline the organization and empower the workforce. These initiatives bore fruit with the PQC and PQA Level 1 recognitions in 2012 and 2016, respectively.

The initiatives and innovations undertaken to create value for its customers and the communities it serves since 2011 were:

1. The development of the UP-NEC Service Framework and Service Clusters to identify areas of expertise and development aligned with the fulfillment of the mandate;



**Figure 4.** UPNEC Service Framework



**Figure 5.** UPNEC Service Clusters

2. The setup of a separate employee performance assessment scheme called the Personnel Performance Assessment System (PPAS) to ensure that all the staff of UP-NEC understand and contribute to the achievement of the UPNEC's overall targets as well as their respective Department's performance target and their individual development targets;
3. The development of a new website and marketing materials (brochure, AVP) to provide a more proactive channel of reaching out to UPNEC's customers and stakeholders;
4. The development of templates for training and advisory services (training calendar, templates of training materials, templates of proposals, contracts/MOAs, project reports) for a more efficient and standardized process;
5. The streamlining of processes to ensure faster turn-around time of services and better coordination with support units like UP Accounting, Supply and Property Management Office

(SPMO), Diliman Legal Office (DLO), Office of International Linkages (OIL) and Office of the Chancellor (OC).

6. The upgrade of the facilities – seminar rooms, audio-visual room and board room, UP-NEC offices and toilets were renovated to provide a more professional, better learning and working environment.
7. The aggressive pursuit of technical assistance projects focused on government agencies like DOE, DOST, DPWH, DFA, DOH, NIA and other government agencies in the future
8. The preparation and securing of BOR approval for the “Fee Structure and Other Guidelines for the Engagement of S&T Personnel” to allow a more liberal application of the contracting and procurement guidelines in offering training and technical advisory services.
9. The application and awarding by the World Bank for the UPNEC to be one of only two Learning Centers in Asia for Environmental and Social Sustainability.
10. The initial offering of blended learning (classroom based and online training) for seminars and exploring other partnerships to expand online training services.

The results of these initiatives showed an improved focus and performance monitoring. Key areas of improvement were noted as follows:

1. Increase in percentage of seminars evaluated from a mere 35% in 2012 to 100% in 2016 to gain better customer feedback on the training services.
2. Increase in number and variety of seminar offerings attuned to customer demand

**Table 1.** Number of Seminar Offerings

	2012	2013	2014	2015	2016
Basic Services	21	15	16	8	22
Health & Environment	3	2	3	10	4
Manufacturing	4	0	1	0	0
System Engg & Management	27	40	44	53	62
<b>TOTAL</b>	<b>55</b>	<b>57</b>	<b>64</b>	<b>71</b>	<b>88</b>

3. Increase in customer contact through the official website with the increase in online registrations from 172 (2012) to 221 (2013) to 316 (2014) to 431 (2015).
4. Increase in seminar profitability (92% in 2012 to 93% in 2013, to 95% in 2014 and 97% in 2015) and reduction in seminar cancellations through direct marketing activities
5. Increase in number of client companies and increase in customer retention with clients availing of UPNEC’s services year on year with 78 new companies in 2012 to 89 (in 2014) and 217 (in 2015).
6. Shift in revenue allocation of training- consultancy-other services from 82-0-8 in 2012 to 45-49-5 in 2016.



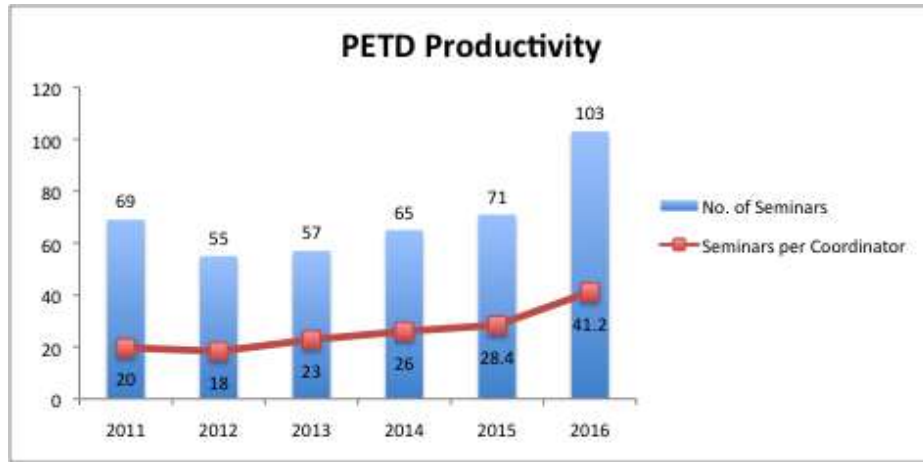
Figure 6. Customer Profile

Table 2. Revenue Contribution

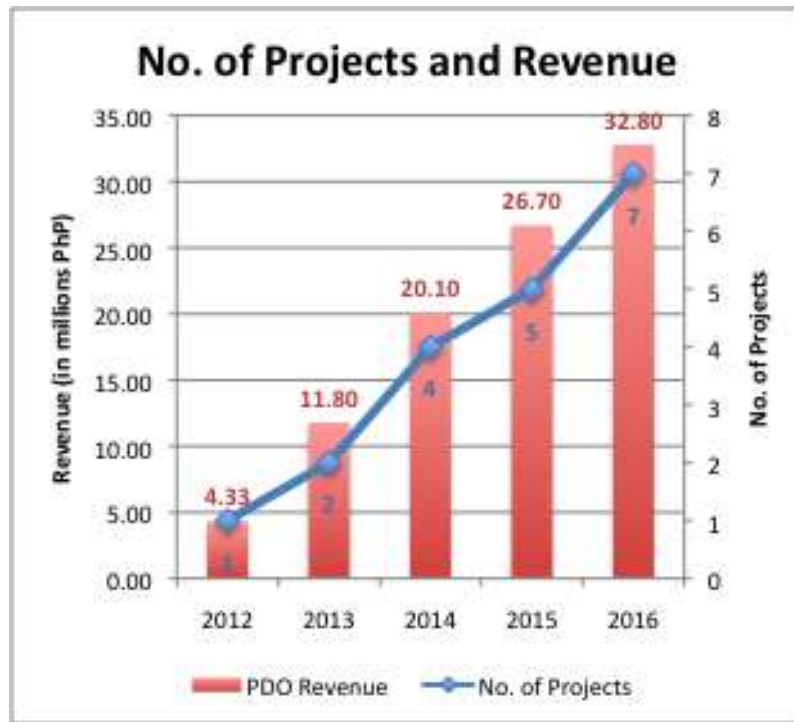
	2011	2012	2013	2014	2015	2016
<b>PETD Revenue</b>	82%	86%	58%	53%	46%	45%
<b>PDO Revenue</b>	0%	14%	38%	43%	49%	49%
<b>Others</b>	8%	0%	4%	4%	5%	5%
<b>TOTAL</b>	100%	100%	100%	100%	100%	100%

7. Increased market awareness of UPNEC’s service offerings with 9,006 unique visits when it was launched in 2012 to 40,481 in 2015. Page views increased from 24,110 in 2012 to 105,151 in 2015.
8. Increased UP-COE faculty involvement as author-contributors of the Philippine Engineering Journal (78% to 100%), lecturers, project consultants from 3 (2012) to 16 (2014) to 39 (2016) consultants and resource persons.
9. Increased personnel productivity (from 18 seminars per coordinator in 2012 to 23 in 2013 and 41 in 2016) with the increase in number of seminars handled and gross revenue earned per head



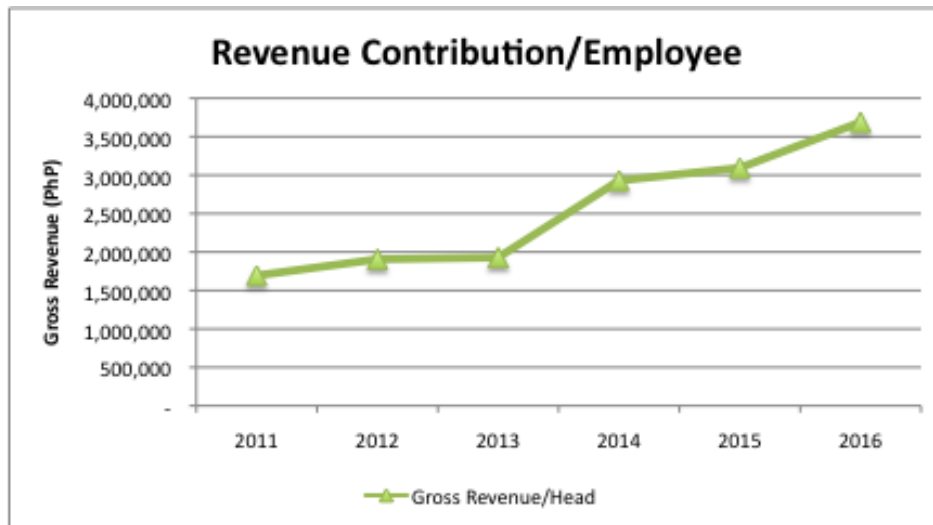


**Figure 7.** Seminar Count & Productivity



**Figure 8.** Project Count & Revenue

- Overall increase in UPNEC’s gross revenue thereby increasing its contribution to faculty and staff development, the University’s maintenance and operating funds. Revenue contribution per employee is also increasing.



**Figure 9.** Revenue Contribution per Employee

But a lot more need to be done to upgrade the organization for UP-NEC to be a true Hub of Engineering Innovations and Technologies. Strategies need to be more clearly defined and linked to the achievement of its mission and vision. The staff, faculty and industry expert partners need to be further developed and strengthened. The customers and stakeholders need to be better identified and targeted. Outcomes need to be better defined and measured.

### 3.2 Strategy

As part of streamlining processes, key areas were identified as focus areas of UP-NEC in providing technical and engineering training and advisory services. These areas were identified as the advocacies that it will support through its training and competency programs, advisory services and information dissemination.

These advocacies were identified as the UP-NEC Service Clusters. These five clusters cover the areas of:

1. Basic Services – includes Energy and Power, Water and Sanitation, Telecommunications, Building and Infrastructure
2. Transportation – includes land, air and sea transport
3. Manufacturing – includes manufacturing processes, materials, equipment
4. Health and Environment – includes disaster risk reduction management (DRRM), bioengineering, ergonomics
5. Engineering Management – includes management science, project management, facilities and asset management, information systems, supply chain, R&D, Design

These service clusters were identified to be within the competency tracks of the Engineering disciplines and aligned with the needs of the country for national development. Initiatives under these service clusters will be given priority and focus.

### 3.3 Strategic Objectives

UP-NEC's key strategic objectives were identified to ensure sustainable operation and support of its activities in fulfilling its mandate by providing a wide selection of products and services to as many individuals and organizations as possible to aid in national development. These key strategic objectives are:

1. Service – cover quality customer service for all stakeholders. This includes breath and depth of service offerings as well as handling time or response rate
2. Reach – providing UP-NEC's mandated service offerings to as many customers and stakeholders as possible with the objective of achieving sustainable national development
3. Sustainability – ensure profitability of seminars and projects to cover operating expenses, infrastructure upgrades, employee and resource pool development, benefits and awards. This will allow UP-NEC to operate even beyond the support of the University and fulfill its mandate as a true National Engineering Center.

### 3.4 Strategy Map

The Strategy Map is a diagram that provides the visual framework for integrating the organization's objectives in the four perspectives of the Balanced Scorecard. It shows the cause-and-effect relationships of developing and leveraging the intangible assets (human capital, information capital and organizational capital) to improving the efficiency of internal processes, enhancing products and services and ensuring compliance to government regulations. Improving the internal processes improves the customer value proposition and enhances UP-NEC's competitive advantage, which should then translate to productivity and growth thus providing long-term shareholder value. Figure 10 shows UP-NEC's Strategy Map.

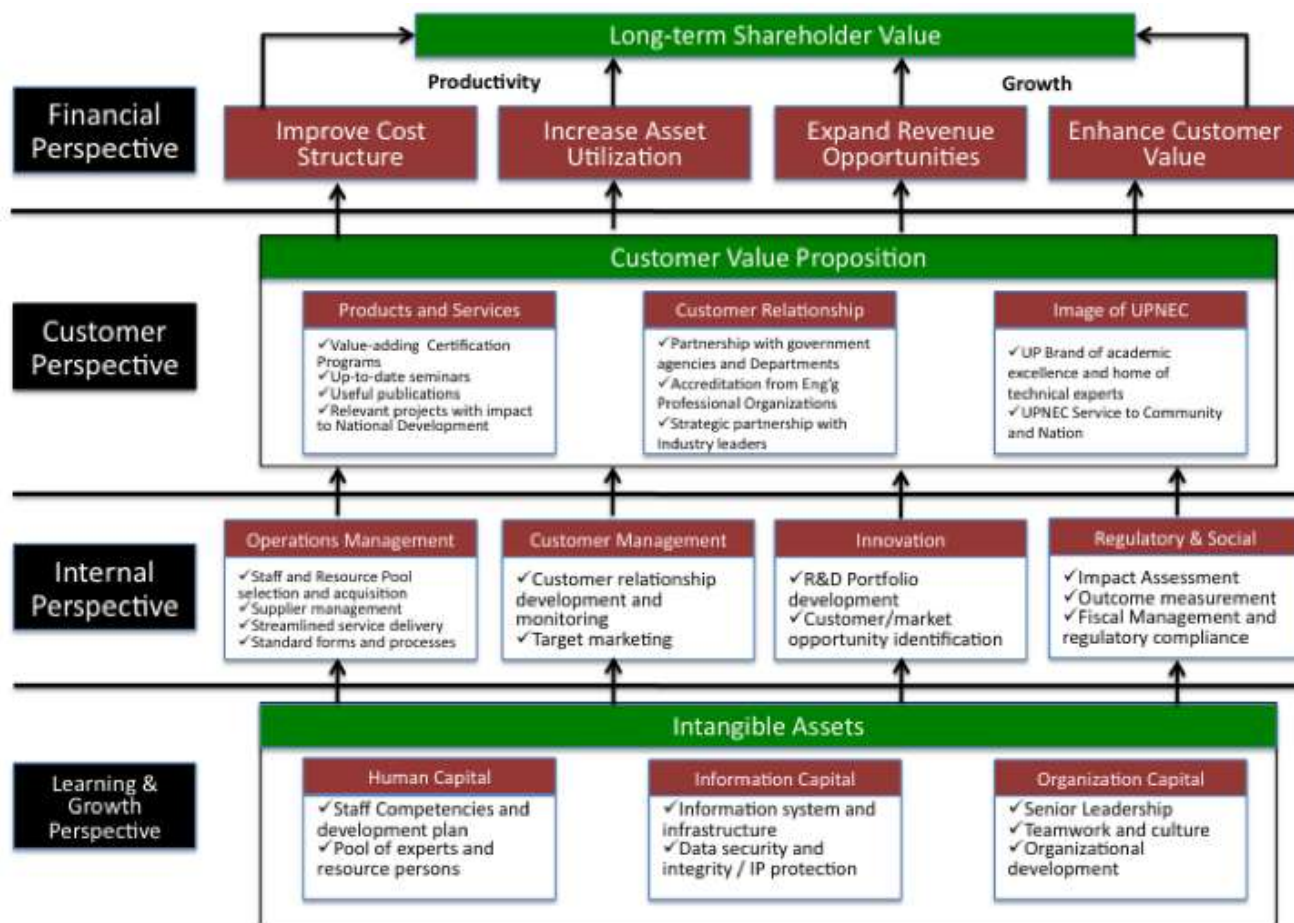


Figure 10. UP-NEC's Strategy Map

### 3.5 Performance Measures

Key Performance Indicators (KPIs) were previously defined, measured and monitored. These KPIs will now be linked to the three strategic objectives of Service, Reach and Sustainability and the four Balanced Scorecard Perspectives – Financial, Customer, Internal Processes, Learning and Growth.

Table 3 shows the UP-NEC Balanced Scorecard (BSC) Matrix. The UP-NEC BSC Matrix plots the key performance indicators within the four BSC perspectives and the UPNEC Strategic Objectives. It aims to determine the alignment of the KPI along the strategic objectives and categorize it among the four perspectives. It is recommended that these KPIs be reviewed and updated every three years, or for every term of the Executive Director.

Targets for each KPI is defined in Tables 4A to 4D. These targets should also be reviewed and set on an annual basis.

### 3.6 Strategic Initiatives

Aligned with the Strategic Objectives and KPIs, initiatives should be developed. The following criteria may be used in evaluating and prioritizing proposed initiatives:

1. Relevance – alignment to strategy and UP-NEC Service Clusters
2. Outcome – impact and contribution to achievement of mission and vision
3. Viability – value and sustainability of training programs, research and advisory projects

Tables 4A to 4D show sample initiatives in line with the objectives and KPIs of each BSC Perspective. These are the action plans developed for every three-year term of the Executive Director as serves as a guide to the staff on priority projects where time and budget will be allocated. These will also be reflected in the individual employee's KPIs indicated in their Personnel Performance Assessment System (PPAS) form.

**Table 3.** UP-NEC Balanced Scorecard Matrix

	<b>Service</b>	<b>Reach</b>	<b>Sustainability</b>
<b>Financial</b>	Customer retention	Communities and stakeholders supported	No. of referral business generated
			Revenue from seminars and certification programs
			Revenue from research and advisory projects
			Revenue growth and profitability
<b>Customer</b>	Number and type of seminars and certification programs	No. of clients (company clients and training participants)	No. of certifications and accreditations from the different Engineering Professional Councils and Organizations
	No. of relevant and innovative service offerings aligned with the defined engineering service categories	No. of new research and advisory projects	No. of services availed per customer or client organization
<b>Internal Processes</b>	Training service evaluation	No. of faculty consultant engagements	Timely and accurate generation of Financial Reports
	Timely and satisfactory delivery of services	Frequency and accuracy of information dissemination through various channels	Compliance to standards and regulatory requirements
	Regular and on-time release of PEJ publication	Increased pool of article referees	
	Supplier Performance Evaluation		
<b>Learning and Growth</b>	Organizational Development aligned with expanding service offerings	Increasing pool of resources (experts and strategic alliances) for training and advisory services	Proactive Staff Recruitment and Development Program
			Relevant Performance Measurement and Reward System

Table 4A - Performance Measures and Initiatives for the Financial Perspective				
Balanced Scorecard			Action Plan	
Objective	Measure	Target	Initiative	Budget
Increase revenue from seminars and certification programs	Gross Revenue from seminars	10% annual growth	Develop at least 2 new seminars per year	
	Gross Revenue from Certification Programs	15% annual growth	Develop at least 1 new Certification Program per year	
			Establish partnerships with professional organizations	
Increase revenue from research and advisory projects	Gross Revenue from projects	20% annual growth	Establish partnerships with at least 2 additional Government Agencies and/or Departments	
			Establish partnerships with industry leaders	
Growth and Profitability	Operating Income	10% operating Income	Ensure all seminars and certification programs are at 5-20% operating income	

Table 4B - Performance Measures and Initiatives for the Internal Processes Perspective				
Balanced Scorecard			Action Plan	
Objective	Measure	Target	Initiative	Budget
Timely and satisfactory delivery of services	Turn-around and response time	95% compliance to target response time	Implement a computerized system to capture transactions and status updates at point of contact	
	On-time and on-budget delivery of projects	95% success rate	Develop a pool of Project Managers adopting UPNEC monitoring and reporting templates	
	Satisfactory supplier performance	Rating of at least 4.0	Institute a Supplier Performance Evaluation System for vendors and resource persons	
Increase pool of resources persons - lecturers, consultants, industry experts, discipline gurus, referees, researchers, staff	Identified resources per discipline within each Service Cluster	90% fulfillment rate	Initiate a recruitment campaign for resource persons per Service Cluster	

<b>Table 4C - Performance Measures and Initiatives for the Customer Perspective</b>				
<b>Balanced Scorecard</b>			<b>Action Plan</b>	
<b>Objective</b>	<b>Measure</b>	<b>Target</b>	<b>Initiative</b>	<b>Budget</b>
Increase customer base	Number of active customers and company clients	5% annual increase	Increase market presence thru sponsorship in target market events and partnership with professional organizations	
	Number of website visits/hits	5% annual increase in hit rate	Assign content management and up-to-date information in the UP-NEC website	
	No. of accreditation and certifications from Engineering Professional Councils	At least 1 additional accreditation per year	Assign and include in the PPAS	
	No. of research and advisory projects	Increase no. of projects by at least 1 per year	Activate the UP-NEC Advisory Board and establish collaborative projects with the member Departments	
Retain Customers	Customer Retention	At least 50% of client base should remain active within a moving three-year period	Assign dedicated staff for customer relations and customer care	
	Expand Service Offerings	Develop at least 2 new seminars and 1 new Certification Program per year	Identify Faculty and industry experts as Program Directors to support each Service Cluster	
	Accomplish project goals	90% accomplishment with Impact Assessment	Institute Project Closure Process which include Impact Assessment and Lessons Learned	
	Number of referral business generated	At least 10% of seminar attendees come from referrals	Establish a promotional campaign to increase referrals	

<b>Table 4D - Performance Measures and Initiatives for the Learning and Growth Perspective</b>				
<b>Balanced Scorecard</b>			<b>Action Plan</b>	
<b>Objective</b>	<b>Measure</b>	<b>Target</b>	<b>Initiative</b>	<b>Budget</b>
Organizational Development	Competency-based manpower recruitment and development	90% fulfillment rate	Secure approval for and implement the updated organizational chart aligned with UP-NEC's strategies	
	Aligned Performance Measurement and Reward System	90% success rate	Develop and implement an enhanced Performance Measurement and Reward System	

#### 4. IMPLEMENTATION

The first four steps of the BSC Framework (Assessment, Strategy, Strategic Objectives, Strategy Map) relate to the Planning Phase. The next two (Performance Measures and Strategic Initiatives) fall under the Approval Phase and are developed on a periodic basis for approval of the senior leadership. The last three steps fall under the Implementation Phase. These are Performance Analysis, Alignment and Evaluation. These three will serve as input to the iterative process of Planning, Approval and Implementation.

Performance Analysis ensures that a system of measuring, monitoring and reporting the performance with respect to each KPI is in place. This reporting system should be transparent and shared among the employees on a quarterly basis to keep everyone on track and on board.

Alignment deals with the agreement and cascade of performance measures among business units – Professional Engineering Training, Project Development, Engineering Information Services, Administrative and Support Services. Since UP-NEC is the research and extension arm of the College of Engineering (COE), alignment should also happen between UP-NEC and the College's academic units (Institutes, Departments, Programs). This alignment may be taken up at the College Executive Board level. The UP-NEC and UP-COE organizational chart should reflect this alignment and support the defined strategies.

Evaluation mechanisms should also be put in place to assess the performance and success of the Initiatives in achieving its goals in support of the Strategies and Strategic Objectives. At the employee level, the Personnel Performance Assessment System (PPAS) is implemented. This system ensures alignment from each employee to each business unit to UP-NEC overall objectives. Aligning the PPAS to the Balanced Scorecard KPIs allows evaluation of performance at the UP-NEC organizational level.

The implementation phase, through the PPAS, has been started back in 2012. However, alignment and proper evaluation with respect to the Strategy and strategic Objectives still needs to happen. It is the next phase of implementation to ensure that UP-NEC fulfills its mandate and achieves its vision.

#### 5. CONCLUSION

The UP-NEC has a clear mandate to develop and promote technical and engineering solutions in aid of sustainable national development. The Balanced Scorecard is viewed as a strategic management system to address the concern of term-based leadership. The Balanced Scorecard Framework of "Nine steps to Success" will provide the mechanism for any incoming Executive Director and Deputy Executive director to plan, approve and evaluate the strategic initiatives for each term. It also provides a mechanism to reassess the situation and redefine strategies as deemed fit by the senior leadership to adapt to changing national and business environment.



## 6. REFERENCES

- [1] The UP National Engineering Center website [www.upnec.com](http://www.upnec.com) (visited July 2016).
- [2] The UC Berkeley Engineering Research Services Office website [www.erso.berkeley.edu](http://www.erso.berkeley.edu) (visited July 2015).
- [3] Pacia, A.A. (2013). *PQA Case Study: Application and Challenges*. Journal of the Philippine Institute of Industrial Engineers, Vol. 10, No. 2.
- [4] [Sang M. Lee](#), [Soongoo Hong](#), (2002) "An enterprise- wide knowledge management system infrastructure", Industrial Management & Data Systems, Vol. 102 Iss:1, pp.17 – 25
- [5] The Health Resources and Services Administration website <http://www.hrsa.gov/quality/toolbox/methodology/performancemanagement/index.html> (visited August 2016).
- [6] Neely, A., Adams, C. & Kennerley, M. (2002), *The Performance Prism: The Scorecard for Measuring and Managing Business Success*, Financial Times Prentice Hall, Great Britain.
- [7] Neely, A., Adams, C. & Crowe, P. (2001), *The performance prism in practice*, Measuring Business Excellence, Vol. 5, No. 2, pp. 6-12.
- [8] The ACCAGlobal website <http://www.accaglobal.com/ie/en/student/exam-support-resources/professional-exams-study-resources/p5/technical-articles/performance-prism.html> (visited August 2016)
- [9] *Mecklenburg County Case Study*, Balanced Scorecard Institute
- [10] *Align the Organization: People, Purpose and Performance*, Balanced Scorecard Institute
- [11] *Build Innovation into Your Strategy*, Balanced Scorecard Institute