# Assessment of ICT Competency Schemes in the Philippines: Challenges of ASEAN

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**Abstract**

Information (Computing) Technology and Communications Technology have been converged that formed *digital convergence*. Since the year 1994 when the Philippines was connected to the internet for the first time[1], *digital convergence* in the Philippines encountered a number of challenges that include the following but not limited to: availability of computer hardware, availability of computer software, reliability and stability of internet services, and *digital literacy* of the people. Surprisingly, the number of Filipino engineering practitioners (Professional Engineers, Registered Engineers, and Technicians) registered in the ASEAN Engineering Registry (AER) is actually 2800 compared with 9530 over-all registrants as of year 2022. Divided equally by ten (representing the ten ASEAN Member States), the equal number distribution is 953 which was lower than the number of Filipino registrants. It seemed that the number of Filipino engineering practitioners registered in AER is actually *higher* than the average number of registered practitioners per ASEAN Member States. On the other hand, not all ICT practitioners were engineers thus *ICT Sector (ICT-S)* and *ICT Enabled Sector (ICT-ES)* were emphasized in this paper to delineate the ICT scenario in the Philippines.

Keywords: ASEAN, benchmark, digital convergence, ICT-S, ICT-ES.

## 1. Background

The telecommunications industry in the Philippines had undergone several revolutions both in the perspectives of the government and private sectors. The Bureau of Telecommunications (BuTel) was founded during the early post-World War II era (1947) and it had offered *telegram* services to the public. Prior to the creation of BuTel, the Philippine Long Distance Telephone Company (PLDT) was already incorporated on November 28, 1928[2]. The latter (PLDT) is a private company while the former (BuTel) is a government organization. BuTel (later converted to Telecommunications Office) reaches areas that PLDT has limited services. This action by the government (through BuTel) was a manifestation of protecting the right of people to have *equitable access*. On the other hand, there were other telecommunication service providers other than PLDT and BuTel in the Philippines. Years hence, technology paced quickly to the point that it created disruptions in which the same created both challenges and opportunities. Meanwhile, the Philippines also established the

National Computer Center (NCC) by virtue of Executive Order No. 322 series of 1971. The National Computer Center has the following functions and responsibilities [3]:

- Provide the information for national development
- Provide computer services or support to National Government Agencies (NGAs)
- Integrate Electronic Data Processing (EDP) operations in the Government
- Provide its NGAs with the necessary technical expertise
- Establish and operate an EDP Educational Center
- Develop EDP personnel qualification standards for all government entities.
- Act as primary agency in planning the integrated development of EDP capability in the National Government.
- Develop and establish a National EDP Coding Standard, in coordination with other government agencies.

Prior to year 1971, there was already law enacted in year 1969 which the Republic Act No. 5734 known as the "Electronics and Communications Engineering Act of 1969". Under Philippine laws, statutes (Republic Acts) are paramount over Executive Orders. Moreover, *board examination* passers were conferred with appropriate Civil Service Eligibilities pursuant to Republic Act No. 1080 (known as "*An Act Declaring the Bar and Board Examinations as Civil Service Examinations*"). Through the years, Information (Computing) Technology and Communications Technology run separately in the Philippines but later converged as a one of the challenges of *globalization*. In the year 1998, the Philippines and other ASEAN Member States opened the ASEAN Engineering Register (AER) that would spearhead the mobility of engineers within ASEAN region pursuant to the ASEAN Secretarial Program for the liberalization of professional services as preparation to *globalization* [5]. The opportunities of being member of AER include the following but not limited to: veracity of the profile of the member, career advancement opportunities in ASEAN Member States, and professional network expansion.

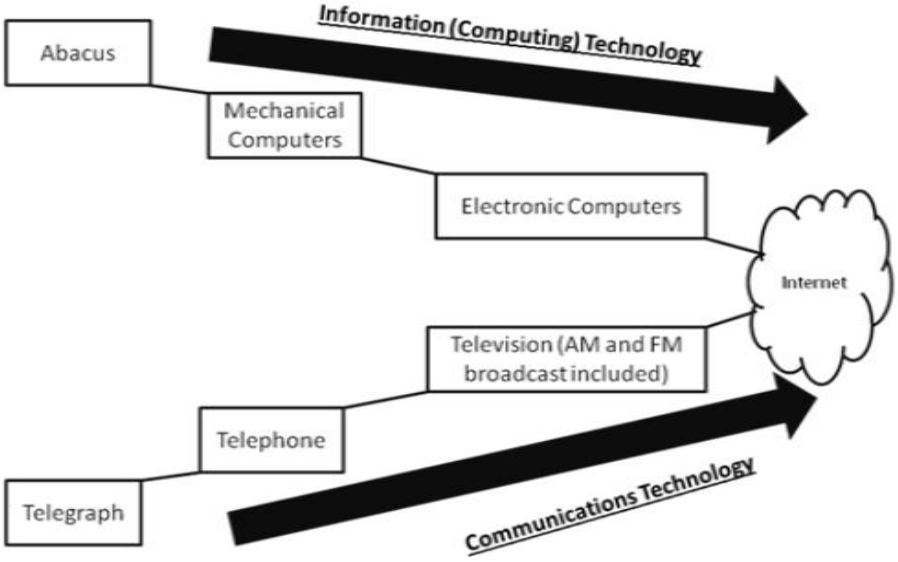


**Fig. 1** "Digital Convergence" indicating the how information technology and communications technology converge each other with respect to time [4]

The scope of practice of Electronics and Communications Engineering (ECE) was broadened when Republic Act No. 9292 (known as "Electronics Engineering Act of 2004") was enacted. Contrary to the misconceptions that truncating the word "Communications" would narrow down the scope of practice of ECE. As a matter fact, Republic Act No. 9292 clearly defined that ICT as well as computer hardware, software and networks were included in the scope of practice of Electronics Engineering (ECE). Moreover, three levels of practice were stipulated in Republic Act No. 9292 which are Professional Electronics Engineer (PECE), Electronics Engineer (ECE), and Electronics Technician (ECT).

**Table 1** Comparison of RA 5734 and RA 9292 [4]

| | **RA 5734** | **RA 9292** |
|---|---|---|
| **Name of Profession** | Electronics and Communications Engineering (ECE) | Electronics Engineering (ECE) |
| **Categories of Practice** | One (Electronics and Communications Engineer or ECE) | Three (Professional Electronics Engineer or PECE, Electronics Engineer or ECE, and Electronics Technician or ECT) |
| **Board Exam Scope (for ECE)** | Mathematics, Electronics Engineering, and Communications Engineering | Mathematics, General Engineering and Applied Sciences, Electronics Engineering, Electronics Systems Technologies |
| **Effectivity** | Repealed by RA 9292 | Still in effect |

## 2. Motivation

The Philippine Information Technology–Business Process Management (IT-BPM) industry exceeded the target for the year 2022 [6]. This is a good indicator inspite of the effects brought by covid-19 pandemic. While tourism sector was one of the sectors severely affected in which most of establishments closed, *healthcare* sector replaced tourism sector as client of IT-BPM sectors. Prior to covid-19 pandemic, IT-BPM industry is one of the big industry in the Philippines that gives revenues to the government. Republic Act No. 10844 also known as DICT Law of 2015 clearly defined the difference between *ICT Sectors (ICT-S)* and *ICT Enabled Sectors (ICT-ES)*. Referring to Republic Act No. 9292, ICT Sectors are actually field of practices of Electronics Engineering (ECE).

**Table 2** Examples of ICT Enabled Sectors and ICT Sectors [4][7]

| **ICT Enabled Sectors** | **ICT Sectors** |
|---|---|
| HR Tasks | Telecommunications |
| Finance | Broadcasting |
| Education Sectors *EXCEPT* to those having Technical Disciplines such as Engineering | Programming / Networking / Computer Hardware and Software |

Aside from the significantly favorable revenues generated by IT-BPM sector (comprise of ICT Sectors and ICT Enabled Sectors), ICT narrows gap between men and women as well as disadvantages of the latter (women sector) [10].

**Table 3** CHED Report: Proportion of College Graduates AY 2013-2014 [9]

| **Discipline** | **Women** | **Men** |
|---|---|---|
| Education Science and Teacher Training | 76.3% | 23.7% |
| Medical and Allied | 71.6% | 28.4% |
| Business Administration and Related | 66.4% | 33.6% |
| *ICT* | *49.4%* | *50.6%* |
| Engineering and Technology | 29% | 71% |

**Table 4** CHED Report: Proportion of College Enrollment AY 2014-2015 [9]

| **Discipline** | **Women** | **Men** |
|---|---|---|
| Education Science and Teacher Training | 75.2% | 24.8% |
| Medical and Allied | 72.2% | 27.8% |
| Business Administration and Related | 65.7% | 34.3% |
| *ICT* | *42%* | *58%* |
| Engineering and Technology | 28.8% | 71.2% |

**Table 5** TESDA Report: Proportion of TVET Graduate AY 2014 [9]

| **Course** | **Women** | **Men** |
|---|---|---|
| Health, Social and other Community Development Services | 91.9% | 8.1% |
| Food Processing | 70.4% | 29.6% |
| Tourism (Hotel and Restaurant) | 65.4% | 34.6% |
| *ICT* | *45.1%* | *54.9%* |
| Electronics | 31.6% | 68.4% |

Data indicated in Tables 3, 4 and 5 were obtained from 2016 Statistical Handbook on Women and Men in the Philippines. On the other hand, DICT was created in 2016 and had made several ICT programs that gave *equitable access and opportunities* (including marginalized sectors) [11].

## 3. Methods

Several studies were gathered in order to synthesize data relevant to the assessment of ICT competency schemes in the Philippines. One scheme is the Licensure Examination for Electronics Engineers (ECE) in which this profession is recognized in the ASEAN region through Philippine Technological Council (PTC) and ASEAN Federation of Engineering Organisations (AFEO) [4]. Despite of promising careers in IT, the Philippine Institute for Development Studies (PIDS) states that the Philippines is facing oversupply of IT graduates[12]. These findings were concurred with the Technical Education and Skills Development Authority (TESDA) report [13]. TESDA further emphasized that the context of

ICT in its report is actually ICT Enabled Sector. Likewise, Commission on Higher Education (CHED) put Bachelor of Science in Information Technology (BSIT) program under moratorium in 2011 and lifted the same in 2014[14][15]. The following table summarized the ICT relative employability per level and sector.

**Table 6** Relative Employability of IT Practitioners [5][12][13]

| | **Relative Employability (Number of Employed versus Number of graduates)** | **ICT Industry Type** |
|---|---|---|
| **Electronics Engineering (PECE / ECE / ECT)** | High | ICT Sector |
| **IT Degree Holders** | Low | ICT Sector / ICT Enabled Sector |
| **IT Technical Skills Level** | Low | ICT Enabled Sector |

Despite of the high revenue of IT-BPM industry of the Philippines, there are apparent reports of unemployment / underemployment of IT practitioners came from Philippine government agencies. However, there are misconceptions that ICT and IT are similar.

Root cause analyses (RCA) were conducted to the unemployment / underemployment reported. First, discipline discussed in this paper concerning ICT is the Electronics Engineering (ECE). Table 7 indicates the number of takers of various engineering licensure examination in the Philippines

**Table 7** Five Year Data on Licensure Examination Takers of Various Engineering Disciplines in the Philippines (2016, 2017, 2018, 2019, and 2021)[16]

| | **2016** | **2017** | **2018** | **2019** | **2021** |
|---|---|---|---|---|---|
| **Aeronautical** | 314 | 376 | 361 | 525 | 241 |
| **Agricultural** | 1000 | 1303 | 1502 | 1886 | 1392 |
| **Chemical** | 1417 | 1502 | 1677 | 1875 | 679 |
| **Civil** | 16847 | 19439 | 21452 | 23930 | 6474 |
| **Electrical (EE)** | 6070 | 6673 | 7206 | 7529 | 2233 |
| **Electronics (ECE)** | 7220 | 7275 | 7332 | 7767 | 974 |
| **Geodetic** | 554 | 748 | 848 | 877 | 694 |
| **Mechanical** | 6113 | 6998 | 7062 | 8609 | 621 |
| **Metallurgical** | 71 | 96 | 68 | 94 | 81 |
| **Mining** | 259 | 317 | 326 | 375 | 274 |
| **Naval Architecture and Marine Engineering** | 99 | 117 | 129 | 156 | 66 |
| **Sanitary** | 199 | 250 | 253 | 300 | 275 |

Referring to Table 7, the total number of examination takers of Electronics Engineering (ECE) for the span of five years was thirty thousand five hundred sixty eight (30568) while the total number of examination takers from all engineering disciplines including ECE is two hundred one thousand four hundred (201400). This infer that the number of ECE comprised of around fifteen percent (15%) of the entire number of examinees. Table 8 indicated the number of passers of respective disciplines for the same given timeframe.

**Table 8** Five-Year Data on Licensure Examination Passers of Various Engineering Disciplines in the Philippines (2016, 2017, 2018, 2019, and 2021)[16]

| | **2016** | **2017** | **2018** | **2019** | **2021** |
|---|---|---|---|---|---|
| **Aeronautical** | 170 | 235 | 185 | 340 | 108 |
| **Agricultural** | 396 | 630 | 851 | 711 | 507 |
| **Chemical** | 854 | 937 | 1033 | 1212 | 321 |
| **Civil** | 7281 | 8586 | 8991 | 9882 | 2374 |
| **Electrical (EE)** | 3624 | 3801 | 4442 | 4885 | 1506 |
| **Electronics (ECE)** | 2831 | 3264 | 3515 | 3825 | 738 |
| **Geodetic** | 232 | 372 | 451 | 481 | 375 |
| **Mechanical** | 4018 | 4599 | 4023 | 5466 | 247 |
| **Metallurgical** | 58 | 82 | 49 | 68 | 50 |
| **Mining** | 211 | 281 | 282 | 310 | 206 |
| **Naval Architecture and Marine Engineering** | 38 | 51 | 52 | 89 | 33 |
| **Sanitary** | 116 | 142 | 157 | 189 | 160 |

Referring to Table 8, the total number of examination passers of Electronics Engineering (ECE) was fourteen thousand seven hundred thirteen (14713) while the total number of examination passers from all engineering disciplines including ECE was one hundred thousand ninety three (100923).

This indicated that the number of ECE passed the licensure examination comprised of around fourteen (14%) of the entire number of examinees who passed the licensure examination.

In order to further infer the number of ECE enrollees as not all engineering graduates take the licensure examination, another table was provided in order to get the average number of examinees per discipline as well as the total number of average examinees per discipline.

**Table 9** Average Number of Engineering Licensure Examinees per Discipline (2016, 2017, 2018, 2019, and 2021)[16]

| | **Average Number of Examinees for the Five-Year Period** | **Average Number of Passers for the Five-Year Period** | **% Passing** |
|---|---|---|---|
| **Aeronautical** | 363 | 208 | 55.49 |
| **Agricultural** | 1417 | 619 | 43.75 |
| **Chemical** | 1430 | 871 | 59.23 |

| | **Average Number of Examinees for the Five-Year Period** | **Average Number of Passers for the Five-Year Period** | **% Passing** |
|---|---|---|---|
| **Civil** | 17628 | 7423 | 41.45 |
| **Electrical (EE)** | 5942 | 3652 | 62.13 |
| **Electronics (ECE)** | 6114 | 2835 | 51.41 |
| **Geodetic** | 744 | 382 | 50.75 |
| **Mechanical** | 5881 | 3671 | 58.34 |
| **Metallurgical** | 82 | 61 | 74.65 |
| **Mining** | 310 | 258 | 82.89 |
| **Naval Architecture and Marine Engineering** | 113 | 53 | 45.87 |
| **Sanitary** | 255 | 153 | 59.67 |

Referring to Table 9, the total average number of engineering licensure examination is forty thousand two hundred eighty (40280). This number could be used to compare number of graduates from disciplines other than engineering. Given that the Electronics Engineering (ECE) discipline did not dominate the number of examinees, this information is significant to analyze how large is the portion of Electronics Engineering (ECE) in the ICT industry of the Philippines given that DICT Law itself clearly stated that ICT Sector included a number of field of practices of ECE.

**Table 10** Comparison of Enrollment Between Engineering and IT-Related Disciplines for a Span of Ten Years [17]

| | **Engineering and Technology** | **IT-Related Disciplines** |
|---|---|---|
| **2009 to 2010** | 49,373 | 49,786 |
| **2010 to 2011** | 57,439 | 54,225 |
| **2011 to 2012** | 56,690 | 66,672 |
| **2012 to 2013** | 59,399 | 72,879 |
| **2013 to 2014** | 63,539 | 72,976 |
| **2014 to 2015** | 70,646 | 74,477 |
| **2015 to 2016** | 76,423 | 77,250 |
| **2016 to 2017** | 82,794 | 73,646 |
| **2017 to 2018** | 86,860 | 77,747 |
| **2018 to 2019** | 87,083 | 81,477 |

The average enrollees under the “Engineering and Technology” discipline group is 69024.6 while the average enrollees under the “IT-Related Disciplines” discipline group is 70113.5 which denotes that the latter has bigger population compared with the former. Given that the latter may do not have significant statistical difference with the former, ECE seems only 15% of 69024.6 as discussed.

## 4. Discussions

It was found out that the relative employability of ECE in ICT Sector is "High" because of lower population than of IT-related disciplines. To further emphasize the difference between ICT Sector (ICT-S) and ICT Enabled Sector (ICT-ES), figure 1 indicates OSI Layer together with concerned sectors of ICT working within it.

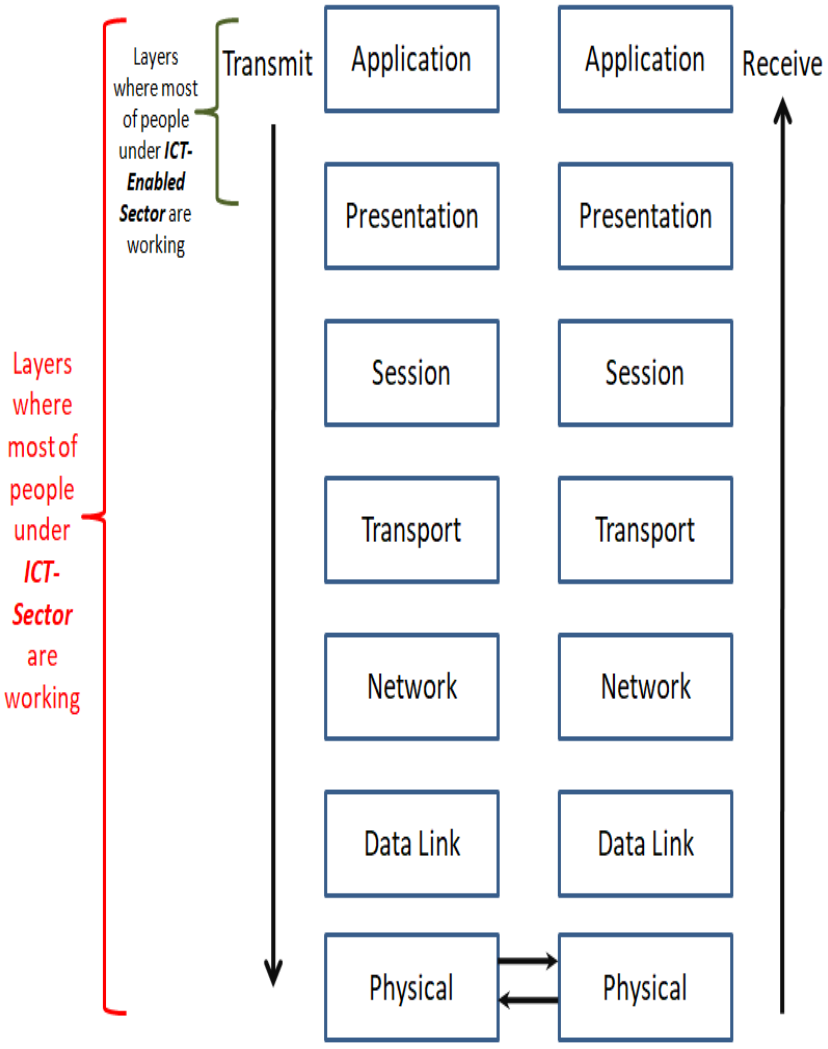


**Figure 1** OSI Layer – Notice that ICT Sector almost encompasses the seven layers of OSI while ICT Enabled Sector covers Application and Presentation Layers

Considering that resources and opportunities are limited, higher population of IT-related disciplines compared with Electronics Engineering (ECE) might be the reason why PIDS reported that there would be "oversupply" of IT until year 2025. Nevertheless, ICT Enabled Sector (ICT-ES) industries such as *call center, medical transcription, and business process outsourcing* have large revenues.

Aside from the Commission on Higher Education (CHED), other state regulatory bodies in the Philippines are Professional Regulation Commission (PRC) and Civil Service Commission (CSC). Tracing back the Philippine History, a Civil Service Board was created by virtue of Public Law No. 5 in 1900 [18]. On the other hand, separate Board Examinations

(Bar Exam in case of lawyers) for various professions were given prior to 1954 when Republic Act No. 1080 which declared Board and Bar Examinations as Civil Service Examinations. Years hence, Presidential Decree No. 223 was signed on June 22, 1973 creating the Professional Regulation Commission (PRC).

In 1978, another law was signed conferring Civil Service Eligibility to Electronic Data Specialist (EDPSE) by virtue of Presidential Decree No. 1408 and the competency assessment shall be done by the Civil Service Commission and the National Computer Center (NCC), through the National Computer Institute (NCI). When the Department of Information and Communications Technology (DICT) was created in 2016, NCC and NCI were abolished.

Assessing these regulatory / benchmarking schemes, passing a "Civil Service" examination will give an individual *eligibility* to enter government service but cannot practice his/her profession whatever degree he/she finished. However, if you pass the board/bar exam you will be conferred with appropriate license to practice profession as well *civil service eligibility* provided that the specific position required or set by Qualification Standard (QS) by CSC is met or surpassed by the individual who possess *eligibility* obtained through board/bar exams.

Unlike the NCC and NCI which were abolished when DICT was created, Professional Regulation Commission still exists and continues to issue and regulate professional licenses. The EDPSE examination is still continued by DICT pursuant to RA 10844 that powers and functions of NCC and NCI will be transferred to DICT.

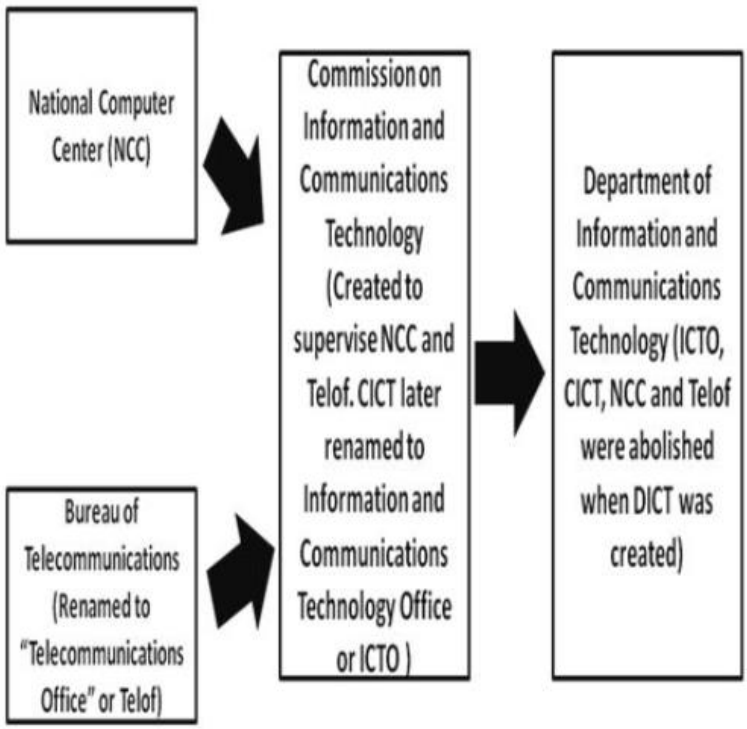


**Figure 2** Convergence of Philippine Government Offices In-Charge with Computers and Communications [4]

## 5. Conclusion

The IT-BPM industry in the Philippines comprise of both ICT Sector (ICT-S) and ICT Enabled Sector (ICT-ES) generated revenue over the target in year 2022. Considering however the human factors such as employability of IT graduates as well as the demands in the market both in the Philippines and abroad, PIDS reported also in 2022 that there would be oversupply of IT graduates until year 2025. Moreover, TESDA confirmed that there could be mismatch of skills for Filipino IT workers under the ICT-ES. On the other hand, ICT-S covered several fields which are actually scope of practice of Electronics Engineering (ECE) pursuant to Republic Act No. 9292. Furthermore, Filipino ECEs (PECE is an advanced level of ECE) passed international benchmark such as ASEAN Engineering Register (AER). The number of Filipino engineering practitioners (Professional Engineers, Registered Engineers, and Technicians) registered AER is actually two thousand eight hundred (2800) compared with nine thousand five hundred thirty (9530) over-all registrants as of year 2022. It seemed that the number of Filipino engineering practitioners registered in AER is actually higher than the average number of registered practitioners per ASEAN Member States. In view of the foregoing, people working in ICT-ES may join Electronics Engineering group under the Electronics Technician (ECT) category as the Electronics Engineering profession is recognized both in ASEAN and APEC.

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