The New Normal and Sustainability Perspectives on Industrial Engineering and Professional Engineering

Khristian Edi Nugroho Soebandrija and Taufik Roni Sahroni
Industrial Engineering Department, Faculty of Engineering,
Bina Nusantara University, Jakarta, Indonesia 11480

Corresponding author: knugroho@binus.edu

Abstract. This paper conveys harnessed theory and its practical execution to orchestrate elaboration on The New Normal and Sustainability Perspectives. How the research is conducted refers to the mentioned harnessed New Normal and Sustainability Perspectives. The adjacent analysis applied in these researches comply with Industrial Engineering and Professional Engineering. The purpose of the analysis is to prove the theoretical hypothesis and its feasible practical execution. This compliance is vis-à-vis Business as Usual, and its extra mile on Crisis and Risk Management. Analysis Results are intertwined with wide arrays of Measurement of Research Model, Testing of Hypothesis, as equipped with Adjacent Analysis. Furthermore, software of both quantitative and qualitative perspectives are reinforced through software of SmartPLS and NVivo Pro. The data gathered to serve the purpose of this study within Theoretical orchestration of Service Innovation that complies with practical execution of Industrial Engineering and Professional Engineering and its subsequent Future Research. This paper elaborates Research Trilogy Dimensions of Antecedents and Consequences, as mediated by its Behaviour of Service Innovation. There are plenty rooms for improvement for subsequent Future Research involving Service Innovation. This future research provides discourse in this ubiquitous Digital Transformation Era, in term of Leadership, Learning of Organization, within Ambidextrous Organization, in wide perspective of Financial Performance.

Keywords: The Subsequent Normal, Sustainable Lens, Mixed Method, Industrial Engineering, Professional Engineering.

1. Introduction
There are three backgrounds to be embedded in this Introduction session. The aforementioned backgrounds are vis-à-vis Business as Usual, and its extra mile on Crisis and Risk Management.

To begin with, as the first background, this paper elaborates fundamental for other backgrounds in this discourse. This first background emphasizes the Crisis during COVID-19 Pandemic, in which Global wise countries have experiences in early 2020 unprecedented crisis. This crisis and eventually Risk Management, include wide arrays of both harnessed theory and its practical execution toward crisis response match theory [1].
Posterior to first background, this second background conveys discourse on Problem Definition in which it elaborates Scope of Research and Model of its Research, within Research Trilogy Dimensions of Antecedents and Consequences, as mediated by its Behaviour of Service Innovation.

The aforementioned problem is furthermore defined and formulated within the scope of The Next Normal and Sustainability Perspectives. To be precise, it refers to organization as its unit of analysis in crisis and eventually risk management situation. This situation is deployed within wide spectrum of crisis and risk management that organization currently faces including this current pandemic.

To wrap up, the third background elaborates the Engineering Trilogy in its spearheaded discourse of Industrial and Professional that are completed in the whole package of Business Engineering; as the forerunner of multidisciplinary.

Industrial Engineering discipline through its vast domain is equipping its academician, practitioner and entrepreneur within the not only manufacturing setting, but also on how to provide service to stakeholders. In order to complete the manufacturing and service related stakeholder purpose, it is deemed indispensable to be considered as well the supply chain ecosystems. The link and match among Industrial Engineering and Professional Engineering are indispensable to enhance the ecosystem of Penta Helix perspectives. Precisely, this Penta Helix refers to orchestrated efforts to aim the ultimate objectives, within academician, business, government, society and media.

Thus, within the spirit of Penta Helix perspectives, the Professional Engineering plays vital roles within the compliance of these roles. To begin with, its ethical constraint is indispensable to be followed by engineers toward society and not individual constraint and interests. Furthermore, the consideration of Occupational, Safety and Health is similarly indispensable to be considered and followed by engineers as well in society perspective.

2. Strategic Decision of The Next Normal and Sustainability Perspectives

Business Engineering Lens constitutes extra mile discourses as compliance with the Stakeholder Lens. In this Digital Transformation Era, Stakeholder behaviours are constantly changing, in particular in this pandemic situation, in which the Business Model and Industry Demand are constantly changing, as illustrated in Figure 1 and Figure 2.

Figure 1 elaborates Matrix of Strategic Horizon on Business Model and Industry Demand, ranging from “Hardly anyone” into optimal and eventually maximum matrix of “Shape a new business” to accommodate and satisfy Stakeholders.

The centre stage of attention is intended to be focused on the need to sustain business and restore operations, as indicated as well in Figure 2, for the purpose of vision of Industry to maintain Profit [2].

The Figure 2 depicts the Industries Constellation within its Trilogy Clusters of Total Change, not only vis-à-vis Business as Usual, and its extra mile on Crisis and Risk Management.

Those Trilogy Clusters represent the shifting Industries Constellation, in which organization need to adjust the shifting Stakeholders’ behaviour in order to be in surviving and excellent Industry Constellation, regardless this Industry is within product and/or service category. In this situation, Stakeholders demand ultimate service excellence in the scope of Service Innovation [3].

Figure 2 elaborates significant consideration on Service Innovation in its wide spectrum of discussion. Nowadays, there are no more segregations of such organization and company is specializing in product or service. In this situation, Product and Service need to be intertwined in order to accommodate Stakeholders’ demand in this Digital Transformation Era.

Furthermore, the Product and Service is furthermore referred as Product-Service Ecosystem. This Product-Service Ecosystem is indispensable to trouble shoot customized approach according to case by case according to its categories category of Top Industries, range cluster of +275 Profits; Middle Industries, range cluster of 11 Profits and Bottom Industries, range cluster of -373 Profits Scale.

To further answer and elaborate the topic of service innovation’s relation to Figure 2. The explanations are originated from the Top Industries, which belong to category of Semiconductors,
Pharmaceutical, Personal Products, Software, and Media. In this pandemic, in Crisis Situation those Industries are deemed to be getting better, in its Service Innovation, vis-à-vis Profit Scale.

![Figure 1](image-url)  
**Figure 1.** Matrix of Strategic Horizon on Business Model and Industry Demand [2]

Subsequently, those Industries in the Middle Industries, are deemed to be in the middle performance, among the mentioned trilogy categories; based upon Figure 2 and based upon the statement in the Stakeholder behavior within Pandemic, as stated in the prior first paragraph vis-à-vis the Ultimate Service for Customers.

In the lens of Bottom Industries, the condition is deemed as worst, within Profit Scale. Precisely, it affects industries that belong to Capital Goods, Insurance, Banks, Diversified Financial, Utilities. To some extent, this category of Industries require extensive interaction, the demands for Service, including Service Innovation are deemed high, not to mentioned the fierce competition.

Thus, the aforementioned paragraphs and its elaboration conclude the answer and elaboration on the relation of Figure 2 and the lens of Service Innovation.

The data supporting the factual situation that service innovation constitutes supporting pillars for industry performance. The aforementioned performance is beneficial as the benchmark for overall and holistic performance in either financial or nonfinancial one. Furthermore, these overall and holistic performances are needed to further escalate leverage to accommodate stakeholders’ demand.

For the aforementioned holistic performances, the harnessed theory and its practical execution, are furthered scrutinized by renowned scholars in these performances’ domain. Scholars of Avlonitis, O’Sullivan and Abela have elaborated performance perspective. Similarly, Scholars of Thakur and Hale have elaborated the pros of the performance. Eventually, Zou and Cavusgil and other scholar works within years of 2001, 2013 and as of 2020 situation, are elaborated as well from McKinsey and Company in Figure 2 and similar Consulting Company [4, 5, 6, 7].

Those back up data are subsequently indicate the best industry performance in specific dimension of stakeholders.
Vis-à-vis financial performance; the best industry performances, as they are indicated, are measured by Market Share; Sales Objective and New Service Profitability exceed objective. Meanwhile, for nonfinancial performance, the best industry performances, as they are indicated are measured by Improved Loyal Existing Customers; Positive Perceived Image; Enhance Profitability of Other Products; and Additional New Customer.

![Figure 2. Industries Constellation within its Three Clusters of Total Change [2]](image)

3. Research Questions
Within Arching Overview, there is significant process to proceed toward research questions within problem definition. These harnessed theory and its practical execution to orchestrate are deemed indispensable to proceed to the analysis.
1. To what extent is the impact toward service innovation due to ambidexterity?
2. To what extent is the impact toward service innovation due to transformational leadership?
3. To what extent is the impact toward service innovation due to organizational learning?
4. To what extent is the impact toward service innovation due to performance?

The aforementioned research questions within problem definition are indispensable as the diction and choices to further elaborate the harnessed theory and its practical execution to orchestrate. In particular, this harnessed factor refers to the antecedents, along with its consequences, as part of behavior of Service Innovation.
The trilogy of the aforementioned dimensions are indispensable within Digital Transformation Era, not to mentioned the contributing factors in Industry 4.0 along with its comprehensive perspective of Strategic Launch in Digital Era [9, 10, 11, 12, 13].

4. The Next Normal
The subsequent normal, known as the new one refers to beyond normal situation, in term of sustainable lens, vis-à-vis Business as Usual, and its extra mile on Crisis and Risk Management. This pandemic constitutes unprecedented situation not merely in term of health aspects, but goes beyond its human kind spectrum of economical, finance and other whole spectrum of life.

The harnessed theory and its practical execution relates and relevant to the next normal, in its theoretical aspects and eventually to its empirical execution. As the leader, especially in this pandemic situation it is commendable to scrutinize the theory and also its practical execution.

The aforementioned execution refers to the one in global perspectives, and also toward the case by case industry cluster. To some extent, the ideal situation is further executed within Indonesia Local Wisdom and Settings.

5. Sustainability Perspective
In prior session, the subsequent normal, known as the new one refers to beyond normal situation, in term of sustainable lens, vis-à-vis Business as Usual, and its extra mile on Crisis and Risk Management.

Within sustainability perspective, the next normal is indispensable to further proceed to the sustainable competitive advantage. Precisely, it refers to the stage of surviving, then, planning to having competitive advantage.

There are wide spectrum of the harnessed theory and its practical execution to orchestrate, in term of Novelty of this paper’s research within both industrial and professional engineering through several perspectives. The aforementioned perspectives constitute Analytic Bibliometric. To some extent, the aforementioned Analytics are intertwined with the Intellectual Structure, and/or Co – Word Analysis toward Systematic Literature Review.

Those analytics constitutes strategic horizon of 40 Years Analytics Bibliometric [14]. The significant works of scholars have conveyed indispensable mapping of sustainability constellation within strategic horizon, as illustrated in figure 3 in the following figure.

![Figure 3. Strategic Horizon and Sustainable Lens of 40 Years Analytics Bibliometric [14]](image-url)
6. Research Elaboration in Methodology Perspectives

Research Elaboration in Methodology Perspectives elaborates hypothesis 1, 2, 3 and 4 as illustrated in figure 4, with its variables, behavior and consequences.

The implementation of the aforementioned perspective is vis-à-vis Business as Usual, and in its extra mile on Crisis and Risk Management.

![Diagram](image)

**Figure 4.** Research Elaboration of its Model and Hypothesis 1, 2,3 and 4

Subsequently, the Research Elaboration in Methodology Perspectives capitalize the Mix Methods Research, known as MMR, that orchestrate both quantitative along with its qualitative approaches. It is furthermore, identified as QUANQual. At this identification the research conveys the sequential mixed methods, within its explanatory; along with its explanation model, known as follow up [15 and 16].

7. Results and Discussions

Data population is obtained by purposive selection. Data are selected from respondents for both questionnaire and interview. These respondents are ranging from the respondent from product and/or service related industries.

The population of 81 is due to the equation from Slovin Formula to identify the population from Unit Analysis of this research. The 81 respondents’ profile and related position are covering President Director, Director, Manager, Head of Department, Vice President, Assistant Vice President and Management Development Program.

Meanwhile, the respondents’ level is intended for measuring financial parameters that are leveraged from Bank Indonesia and OJK. They comprise of Deputy Governor of Bank Indonesia and Director of OJK. In this situation Deputy Governor of Bank Indonesia, is governing wide ray of director of department within Bank Indonesia.

There are 120 questionnaires are disseminated, and obtained 81 expert respondent based upon profile and related aspects for this research and its research model.
The 29 questions are segregated into 6 questions on ambidexterity; 3 questions of transformational leadership; 3 questions of organizational learning; 8 questions of service innovation; and 9 questions of performance. Content validity is conducted vis-à-vis respondents within their level as directors, to enable the questions are clear and can be comprehended within the theoretical and its managerial implication.

Software of both quantitative and qualitative perspectives are reinforced through software of SmartPLS and NVivo Pro. The statistics analysis is conducted by its Sample, including its mean and standard deviation (STDEV). To some extent, this analysis refers to P values, Hypothesis test along with its T statistics, with the criteria that t value is greater than zero. Further analysis refers to the df, known as degree of freedom, within Gaussian distribution, including the inner and outer model [17]. Ultimately the AVE, known as Average Variance Extracted and CR, in term of Reliability and its composite, in the following Table 1 and R Values in Table 2.

**Table 1. Validity Matrix within value of AVE and CR**

| Identification | Variables                          | AVE Value | CR Value | Validity and Reliability |
|----------------|------------------------------------|-----------|----------|--------------------------|
| A one          | Ambidexterity and its structural   | 0.6100    | 0.8230   | Validity Status          |
| A two          | Ambidexterity and its contextual   | 0.7000    | 0.8750   | Validity Status          |
| A Total        | Variable of Ambidexterity          | 0.5130    | 0.8620   | Reliability Status       |
| Trans Leadership TL | Variable of Transformational Leadership | 0.6980    | 0.8740   | Reliability Status       |
| Org Learning OL | Variable of Organizational Learning | 0.6960    | 0.8710   | Reliability Status       |
| SI one         | Exploitation Variable of Service Innovation | 0.7020    | 0.9040   | Validity Status          |
| SI two         | Exploration Variable of Service Innovation | 0.6570    | 0.8840   | Validity Status          |
| Service Innovation | Behavior of Service Innovation    | 0.6420    | 0.9350   | Reliability Status       |
| NFP            | Non Financial Performance          | 0.6870    | 0.8970   | Validity Status          |
| FP             | Financial Performance              | 0.5760    | 0.8710   | Validity Status          |
| Performance    | Consequence of Performance         | 0.5610    | 0.9190   | Reliability Status       |

Loading Factor value is greater or equal than 0.50. Furthermore, Model constitutes the Reliable and Valid one, if the condition is met, in which AVE and CR is greater or equal than 0.7 within its constraints [18].

The outer model or measurement model is beneficial to measure empirical relationships among the indicators and dimension/variable. The evaluation complies the rules of thumb which are: a. Loading Factor >= 0.50, b. Model is Reliable and Valid, as the implication of Average Variance Extracted (AVE) and Composite Reliability (CR) >= 0.7 (Hair et al., 2014).
The inner model or structural model is beneficial to measure empirical relationships among dimension/variable. The evaluation complies the rules of thumb which is R Square Value. The interpretation of the R Square Value is depending on the model and research discipline. The benchmark category for R Square values of 0.75, 0.50, or 0.25 for the endogenous Dimension/Variable/Construct is Substantial, Moderate and Weak.

The hypothesis test of implied SmartPLS 3.0 is obtained by considering the original sample (O), sample mean (M), standard deviation (STDEV). Furthermore, the T statistics is obtained by absolute value of |O / STDEV|, in which through the P values.

The T statistics criteria is t value > 0. In SmartPLS 3.0, the conclusion of hypothesis is obtained by obtaining patch coefficient criteria is positive and significance of construct is significant.

T Statistics relates to its Criteria, in which t value > 0. This test statistics is complying to a t-distribution with degrees of freedom (df). The t-distribution is well approximated by the normal (Gaussian) distribution for more than 30 observations.

| Table 2. Value of R Square Values with Analysis of SmartPLS 3.0 |
|---------------------------------|
| **Value of R Square**          |
| A one                           | 0.7240   |
| A two                           | 0.8400   |
| Financial Performance           | 0.9070   |
| Non Financial Performance       | 0.8930   |
| Performance                     | 0.5230   |
| Service Innovation              | 0.7800   |
| SI one                          | 0.9470   |
| SI two                          | 0.9440   |

8. Conclusions
To begin with, this conclusion provides bridge of overview on a connection between study objective, hypothesis, result and its conclusion; in addition to the implementation of the Next Normal.

The objective of this study relates to harnessed theory and its practical execution to orchestrate elaboration on The New Normal and Sustainability Perspectives. The adjacent analyses applied in these researches comply with Industrial Engineering and Professional Engineering.

Furthermore, the hypothesis relates to on how to proceed the analysis and to answer the following questions on to what extent is the impact toward service innovation due to ambidexterity; and to what extent is the impact toward service innovation due to transformational leadership. Subsequently, the other questions are to what extent is the impact toward service innovation due to organizational learning; and ultimately, to what extent is the impact toward service innovation due to performance.

Subsequently, the above objective and the hypothesis relate as a holistic connection with its results and conclusion.

Precisely, in term of results and its conclusion, and In order to face and prepare, then implement the Next Normal; there are factors that have big priorities to execute, vis-à-vis collected and analyzed data of this research along with its questionnaires.

First, Technology is deemed as the highest priority, representing biggest factor of the whole priorities, to implement the Next Normal; as big portion of activities are shifted in escalating scale within technology of digital transformation. The emphasized factor in this scope is the one that relates technology to Industry X.0; thorough its pillars of Connected Products, Digital Engineering and
Digital Operations. In order to implement it, the collected and analyzed data have supported this situation. In particular, in the Antecedent data of Organizational Learning plays vital role in capitalizing this technology. To some extent, Organizational Learning’s AVE and CR are respectively 0.6960 and 0.8710. Thus, this Organizational Learning is deemed as indispensable leverag

to implement the Next Normal.

Second, Innovation is deemed as the priority, representing leveraging factor of the whole priorities, to implement the Next Normal; as big portion of activities are shifted in escalating scale within Innovation of Service Innovation

The emphasize in this scope is the one that relate innovation to both incremental, known as Continuous Improvement or Service Innovation Exploitation; and radical, known as breakthrough or Service Innovation Exploration

Service Innovation Exploitations are characterized through its pillars of Quality Improvement; Flexibility Improvement; Service Cost Reduction and Service Enrichment toward Stakeholders.

Meanwhile Service Innovation Exploration are characterize through its pillars of New Service, Extended Service Range and New Market; along with new technology.

In order to implement it, the collected and analyzed data have supported this situation. In particular, in the behavior data of Innovation plays vital role in capitalizing this Service Innovation

To some extent, Service Innovation’s AVE and CR are respectively 0.7020 and 0.9040 for Service Innovation Exploitation and 0.6570 and 0.8840 for Service Innovation Exploration.

References
[1] Raithel S and Hock S J 2020 The crisis-response match: An Empirical investigation Strategic Management Journal 1-15
[2] Tonby O and Woetzel J 2020 Could the next normal emerge from Asia? McKinsey and Company
[3] Grawe S J, Chen H Z and Daugherty P J 2009 The relationship between strategic orientation, service innovation, and performance International Journal of Physical Distribution & Logistics Management 39(4) 282-300
[4] Avlonitis G J, Papasthaopoulou P G, Gounaris S P 2001 An empirically based typology of product innovativeness for new financial services: Success and failure scenarios brief biographies of the authors 1-48
[5] O’Cass Sullivan A and Sok P 2013 Exploring innovation driven value creation in B2B service firms: The roles of the manager, employees, and customers in value creation Journal of Business Research 66 1074-84
[6] Thakur R and Hale D 2016 Service innovation: A comparative study of U.S.and Indian service firms Journal of Business Research 66 1108-23
[7] Vaccaro I G, Jansen J J P, Van Den Bosch F A J and Volberda H W 2012 Management innovation and leadership: The moderating role of organizational size Journal of Management Studies 49(1) 28-51
[8] Wenzel M, Stanske S and Lieberman M B 2020 Strategic responses to crisis Strategic Management Journal 41 V7–V18
[9] Biber S H and Johnson R B 2013 Coming at things differently: Future directions of possible engagement with mixed methods research Journal of Mixed Methods Research 7(2) 103-9
[10] Gustafsson A, Kristenson P, Schirr G R and Witell L 2016 Service Innovation New York Business Expert Press
[11] Lee Y D, Chen S H and Kuo J H 2014 Exploring the intellectual structure of organizational learning studies European Journal of Research and Reflection in Management Sciences 2(2) 76-83
[12] Schwab K 2016 The Fourth Industrial Revolution Geneva World Economy Forum
[13] Skinner C 2014 Digital Bank. Strategies to Launch or Become a Digital Bank Singapore Marshall Cavendish Business
[14] Wang C, Lim M K, Zhao L, Tseng M L, Chien C F and Lev B 2020 The evolution of Omega- The International Journal of Management Science over the past 40 years: A bibliometric overview Omega 93 102098

[15] Creswell J W and Plano Clark V L 2011 Designing and conducted mixed methods research 2nd Edition Thousands Oaks, CA SAGE

[16] Creswell J W 2014 Research Design. Qualitative, Quantitative, and Mixed Methods Approaches London SAGE

[17] Hair J F, Hult G T M, Ringle C M and Sarstedt M 2014 A primer on partial least squares structural equation modeling (PLS-SEM) Los Angeles SAGE

[18] Latan H and Ghozali I 2012 Partial Least Squares: Konsep, Teknik dan Aplikasi SmartPLS 2.0 M3 penelitian Empiris Semarang Badan Penerbit Universitas Diponegoro