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## New Research Models under Exploratory Research Method

P.S. Aithal<sup>1</sup> and Shubhrajyotsna Aithal<sup>2</sup>

<sup>1</sup>Faculty, Institute of Management & Commerce, Srinivas University, Mangalore, India

<sup>2</sup>Faculty, Institute of Engineering & Technology, Srinivas University, Mangalore, India

Corresponding author: [psaithal@gmail.com](mailto:psaithal@gmail.com)

### ABSTRACT

This Chapter contains an overview of various research methods used in a systematic research methodology with emphasis on the exploratory research method. Insights of exploratory research methods with characteristics and types are described and discussed. Some of the new research methods & procedures under exploratory research method along with different possible analysis frameworks are described with special emphasis on ABCD analysis and patent analysis as a type of exploratory research.

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**Keywords:** New research methods, Types of research methods, Research methodology, Exploratory research method, Types of exploratory research methods, Characteristics of exploratory research methods, Research Case Study, ABCD analysis, Patent analysis.

### INTRODUCTION

Research is a process of the generation of new knowledge of any real or imaginary thing or a new interpretation in a creative way of existing knowledge of any real or imaginary thing<sup>[1]</sup>. More concisely, it is a process of systematic inquiry to solve an identified problem through the collection of data, documentation of data into critical information, analysis, comparison, evaluation, and interpretation of data or information by using suitable methodologies developed and accepted by specific professional industrial and academic

disciplines. Accordingly, research is divided into two major classes called industrial research and academic research. Academic research focuses on creating new ideas, concepts, theories, perspectives, arguments, interpretations, etc. while solving a research problem and publishing it to or sharing it with the research community worldwide. On other hand, industrial research focuses on creating a new and useful device, substance, method, or process with the intention to get commercial gain. Academic research gives the benefit of copyright of publication to the researchers and industrial research gives the benefit of patent of the invention to the researchers as summarized in Table 1.

**Table 1:** Comparison of academic research and industrial research

| Sl. No. | Classes of Research | Outcome of Research                                       | Possible outcome as Benefit to the Researchers (IPR) |
|---------|---------------------|---|--|
| 1       | Academic Research   | New knowledge or new interpretation of existing knowledge | Copyright  |
| 2       | Industrial Research | New device, new substance, new method, or new process     | Patent   |

In academic research, the researchers need various research skills including (i) Analysis, (ii) Comparison, (iii) Evaluation, (iv) Interpretation, and (v) Creation. In addition, researchers should identify a problem by knowing its current status and desired status and find a suitable method to solve it. The entire process of identifying a problem, converting it into research objectives, finding a method to solve it, analyzing & interpreting the results, and publishing the outcome to the entire research community is called research methodology. More specifically, the research methodology includes logic of data/information collection, method of data/information collection, method of data/information analysis & interpretation, and Ethical issues in collection analysis, interpretation, and publication<sup>[2]</sup>.

## **Objectives of the paper**

1. To highlight various research method under a systematic research methodology.
2. To explore the details of features of exploratory research method.
3. To discuss exploratory research method including its characteristics.
4. To compare experimental and empirical research methods with exploratory research method.
5. To evaluate the procedure of conducting exploratory research.
6. To identify and analyse the types of exploratory research method.
7. To analyse the Case Study research method as alternative name of exploratory research method and differentiate it with teaching case study methods.
8. To identify and list various analysis frameworks used in exploratory research with references.
9. To make recommendations to researchers about the use of exploratory research methods in their research methodology.

## **Types of research methods**

As per one school of thought, there are three major general research methods commonly used in academic research. They are: (1) Experimental Research method, (2) Empirical Research method, and (3) Exploratory Research method. Each method contains many sub-methods based on the requirement and comfortability of the researchers to fulfill the research objectives. Both experimental and empirical methods usually use quantitative approaches, and exploratory methods use qualitative, or quantitative, or mixed approaches<sup>[1]</sup>.

As per another school of thought, there are four major general research methods used in academic research. They are: (1) Exploratory research method which explains the reasons for the phenomenon and usually uses a qualitative approach, (2) Conclusive research method which provides information for the assessment of alternative solutions and usually uses a qualitative or quantitative approach or both, (3) Descriptive research method to investigate the facts aimed at describing the characteristics of the system and usually uses a qualitative approach, (4) Casual research which helps to reveal the cause and affect relations and usually uses a quantitative approach.

## **Research methodology**

With the progress in scientific thinking of the people of new generations about research and publications, thinking on new research methodologies is gaining importance. Accordingly, one of

1. Identifying the research area
2. Developing a research issue/problem
3. Finding the current status
4. Predicting the ideal solution or desired status
5. Identifying the research gap
6. Determining the research agendas,
7. Analysing the research agendas,
8. Choosing an optimum research agenda
9. Converting it into a research question
10. Developing the research objectives
11. Identifying a suitable Conceptual/theoretical model through a systematic review of existing literature or Creating a Conceptual/theoretical model through Focus group interactions using Inductive Approach by developing suitable Postulates and objective functions.

12. Analysing, comparing, and evaluating the chosen Conceptual/theoretical model in terms of factors affecting it.
13. Developing hypotheses for the chosen Conceptual/theoretical model
14. Choosing a suitable research method (experimental/ empirical/ exploratory) for hypotheses testing by means of data collection/ information collection & statistical analysis, using a deductive approach.
15. Use one or more research skills based on choosing a suitable: (a) analyzing framework, (b) comparing framework, (c) evaluating framework, (d) interpretation framework, and (e) creating a framework, for research outcome analysis.
16. Suggest or recommend optimum solutions to the research problem to make the right decisions at right time.

The above 16 phases of doing systematic research are together called research methodology.

## **Exploratory research method**

The exploratory method, usually qualitative, explains the reasons for the phenomenon identified in the research question which is not clearly defined. This method typically seeks postulates based on collected and analysed information to develop hypotheses rather than testing them. An exploratory research method is used to identify, understand, analyse, compare, evaluate, and interpret a problem and its possible solutions to give suggestions. Exploratory research applications include reviews, case studies, field observations, focus group interactions, and interviews to collect information for developing postulates and analysis of such postulates as per certain chosen constructs under identified issues. Apart from answering what, why, and how, it discloses avenues

to identify the deep insights of a problem or an issue under consideration from various frames of reference<sup>[3-6]</sup>.

### ***Characteristics of Exploratory Research***

1. It is a research method to study the deep insight into a system or an issue by means of collecting information rather than data.
2. Can be used in all subject areas including natural sciences and philosophical sciences and at all levels of research problems (simple to complex).
3. Can have procedures of varied complexity based on the type of problem and anticipated solution.
4. Structured method to solve the structured, semi-structured, and unstructured problems and can be customizable by individual researchers based on objectives identified.
5. A suitable method to solve conceptual and analytical problems.
6. Exploratory research focuses on analysis, comparison, evaluation, and interpretation of existing knowledge instead of creating new knowledge and supports for better decision-making through newly developed suggestions/recommendations.
7. The method uses information collection than data collection, the time, effort, and cost of research can be minimized and controlled.
8. The output of the research – new interpretations and suggestions need not be same for researchers who work on the same type of problem/issue due to the reason that information collection, analysis framework, and interpretations vary with individuals, internal and external environmental factors.
9. Exploratory research can use a qualitative approach, a quantitative approach, or a mixed approach by

using information, secondary data, or both of them, respectively.

10. Since the method is flexible and universal in terms of subject areas, both beginners and expert researchers find the benefit of use.
11. The qualitative exploratory research method can be made simple and researcher friendly due to the opportunity to avoid complex instrumentation (as in experimental methods) and huge data collection & advanced statistical data analysis techniques (as in empirical methods).
12. Researchers have the flexibility to decide the type of exploratory method, the sources and the amount of information to be used by setting the objectives, and by adopting suitable analysis frameworks.

**Table 2:** Characteristics of Exploratory Research with details

| Sl. No. | Characteristics                     | Explanation   |
|---------|-------------------------------------|---|
| 01      | Simple and less time-consuming      | Since laborious and time-consuming processes like data collection, Data validation, Model building, and hypotheses testing are avoided, the method is simple and less time-consuming. |
| 02      | Customizable and Flexible procedure | The procedure for the exploratory research method can be changed as per the objectives set for analysis & interpretation.   |
| 03      | Information-driven, not data-driven | Since the method uses information collected from different sources using the internet or through a focus group, the challenge of error-free primary data collection is eliminated.    |
| 04      | Open-ended                          | New formulations and procedures can be added and new analysis frameworks can be developed and used for new interpretations.   |

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|----|---|---|
| 05 | Qualitative approach                                      | The method uses one or more qualitative analysis frameworks for information analysis & interpretation.  |
| 06 | Based on Research skills                                  | The method uses various identified research skills including analysis, comparison, evaluation, interpretation, and suggestions  |
| 07 | Focussed on new interpretations of existing information   | The expected outcome of exploratory research is new interpretations and new insights on the research topic considered.  |
| 08 | Varied procedures   | Since the method is used in all areas of natural science and philosophical sciences, Researchers have the flexibility to use existing analysis frameworks or to create new analysis frameworks to address their defined objectives. |
| 09 | Provides deep insights on the topic under consideration   | The analysis frameworks and procedures adopted in exploratory research by collecting suitable information provide deep insights into the problem/ issue/ system under consideration.  |
| 10 | The outcome is in the form of suggestions than a solution | The new interpretation of the research topic leads to new suggestions to solve the problem or to improve the solution in the decision-making process.   |
| 11 | No or least statistical analysis required                 | Since the method does not need to prove hypotheses, the use of statistical methods to find the relationship between variables can be eliminated.  |
| 12 | An alternative research method to get research experience | Popular research method for researchers to engage in research and get the experience of doing research at low cost and fewer facilities and publish systematically.   |

**Table 3:** Comparison of Exploratory research method with experimental and Empirical methods

| Sl. No. | Feature                 | Experimental Method | Empirical Method | Exploratory Method            |
|---------|-------------------------|---------------------|------------------|-------------------------------|
| 1       | Approach                | Quantitative        | Quantitative     | Qualitative                   |
| 2       | Input used for analysis | Primary data        | Primary data     | Information or secondary data |

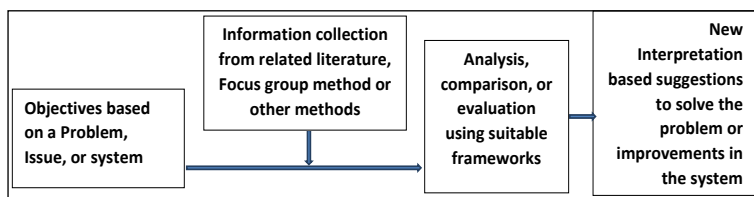


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| 3  | Type of proof.      | Proving Postulates experimentally  | Testing the Hypotheses empirically   | Proving the Postulates through analysis   |
| 4  | Type of Problem     | Experimental analysis & verification   | Empirical analysis & verification  | Research skills-based analysis & interpretation   |
| 5  | Nature of Objective | Proving a theoretical model  | Proving a conceptual model   | New Interpretations and suggestions to improve a system   |
| 6  | Tool required       | Instruments  | Questionnaire  | Analysis frameworks   |
| 7  | Merits              | Precise characterization of materials, Components, device, etc to prove a theory | Proof of hypotheses of a conceptual model using data driven statistical analysis | Developing suggestions to improve the system or solve a problem through research skills-based analysis frameworks |
| 8  | Benefits            | Testing a theory in terms of internal and external components                    | Testing a conceptual model in terms of various factors affecting the model       | Improving the decision by providing suitable suggestions through systematic analysis                              |
| 9  | Constraints         | Data validation & Instrumental errors  | Data validation & sample size  | Validation of authenticity & reliability of the information   |
| 10 | Demerits            | Dependency on sophisticated Instrument   | Dependency on optimum Questionnaire  | Dependency on suitable analysis framework   |

## Evaluation of the procedure to conduct exploratory Research

1. Identify a problem, or an issue, or a system which has to be researched using an exploratory method.
2. Develop the objectives and type of methods under exploratory research method to analyse, compare, evaluate, and interpret it in a new way.
3. Fulfil the objectives by collecting the information, and analysing them using one or more suitable analysing, or comparing, or evaluating frameworks.
4. Suggest the optimum solution related to the considered issue or recommend improvements in the considered system as a new interpretation in the form of postulates using an inductive approach.

The procedure of conducting exploratory research is further simplified and shown in block diagram 1. Exploratory research is a part of research methodology after identifying the research problem by skipping the process of determining research gap and research agendas given in section 4.



**Fig. 1:** Block diagram representing the simplified procedure for conducting exploratory research

## Types of exploratory Research Methods

There are many kinds of research methods are developed and used in the literature under the explorative research method. Some of the important explorative research methods include

Research case studies, Organization analysis, Leadership analysis, Performance analysis, Patent analysis, Thesis analysis, Technology analysis, Product analysis, Service analysis, Material analysis, System analysis, Situation analysis, Disease analysis, Budget analysis, predictive analysis, etc. Sometimes, case study method is generally used to represent the explorative research method in the literature. Table 4 depicts some of the new research models under exploratory methods. Certain types and sub-types are inter-related and complementary to each other. In all these cases, the research analysis focuses on exploring deep insights of the issues and things considered for research using research skills including analysis, comparison, evaluation, and interpretation. Explorative research may lead to identifying new research problems further to create new knowledge or new innovation which may need experimental or empirical study<sup>[7-8]</sup>.

**Table 4:** Major types of Exploratory Research models with objectives

| Sl. No. | Major Types of Exploratory Research Methods | Focus                                 | Types  |
|---------|---|---------------------------------------|--|
| 1       | Research Case Study                         | Issue/Case-Based Improvements         | Innovation Analysis<br>Problem-Solution Analysis<br>Issue Analysis<br>Situation Analysis<br>Disease Analysis |
| 2       | Organizational Study                        | Stakeholders' point of view           | Industry Analysis<br>Company Analysis  |
| 3       | Technology Study                            | Merits, Demerits, and Applications    | Technology Analysis<br>Patent Analysis   |
| 4       | Leadership Study                            | Leadership Efficiency & Effectiveness | CEO Analysis   |

|    |                          |   |  |
|----|--------------------------|---|--|
| 5  | Product/Service Analysis | Features from Stakeholders' point of view                                       | Product Analysis<br>Service Analysis                       |
| 6  | System Analysis          | Effectiveness & efficiency of a system in terms of input, processes, and output | Material Analysis<br>Country Analysis<br>Religion Analysis |
| 7  | Financial Analysis       |   | Budget Analysis<br>Profit Analysis                         |
| 8  | Performance Study        | Productivity, Output<br>Performance, Optimization,                              | Performance Analysis                                       |
| 9  | Future Analysis          | Future challenges, strategies, and performance                                  | Predictive Analysis<br>Innovation Analysis                 |
| 10 | Quality Analysis         | Evaluation & Comparison of quality  | Thesis Analysis<br>Research Analysis<br>Book Analysis      |
| 11 | Resource Analysis        | Focus on various Resources required for leading life in society                 | Analysis of various resources required for a system        |

## Types of Case Studies

The case study is sometimes used as alternative representation for the exploratory research method, though it is a type of exploratory research method. In general, Case study is divided into two types: (1) Research Case Studies, and (2) Teaching Case Studies. Research case studies is a class of exploratory research method involving systematic analysis, comparison, evaluation, Interpretations and suggestions on a problem, issue, organization, or system<sup>[9 - 10]</sup>. The objective of exploratory research is new interpretation of existing knowledge or creation of new knowledge. On other hand, teaching case studies use teaching -learning skills like, reading, memorizing,

understanding, applying the given concepts solve a problem or to discuss a situation to evaluate the quality of the decision and its consequences. There are two types of teaching-learning case studies. Long case studies and short case studies called caselets. A caselet is a shorter version of a case study, generally two to three pages in length. Caselets are similar to case studies in that they may either describe a sequence of events or put forth an issue or problem that requires decision-making. Table 5 depicts various types of research case studies with representative references.

**Table 5:** Types of Research Case Studies with Objectives and References

| Sl. No. | Types               | Description  | Representative References |
|---------|---------------------|--|---------------------------|
| 1       | Industry Analysis   | Analysis of an industry under primary, secondary, tertiary, or quaternary industry sectors based on a chosen objective and analysis frameworks                   | [11-14]                   |
| 2       | Company Analysis    | Analysing a company based on set objectives to give suggestions to improvements  | [14 -20]                  |
| 3       | Leadership Analysis | Analysing a leader or manager in terms of identified objectives by collecting information from various sources   | [21 - 22]                 |
| 4       | Business Analysis   | Analysis of various issues of a business proposal, comparison, with others for sustainability, and evaluation of it based on set objectives                      | [23 – 24]                 |
| 5       | Product Analysis    | Analysis of various features of a product for satisfying its customers using one or more suitable analysis frameworks  | [25 - 26]                 |
| 6       | Service Analysis    | Analysis of various features of a service and delivery for customers satisfaction, delightment, and enlightenment using one or more suitable analysis frameworks | [27 – 28]                 |

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|----|----------------------|--|-----------|
| 7  | Technology Analysis  | Analysis of a technology used in terms of its ability to solve basic problems (need based), advanced problems (want based), and fantasy problems (dreamy desire based) of society.   | [29 – 33] |
| 8  | Patent analysis      | Analysis of usefulness, complexity of realization, benefits of commercialization, and future economic value of a patent by setting the suitable objective  | [34 -35]  |
| 9  | Disease Analysis     | Analysis and interpretation of a disease based on various medical reports and symptoms and to find possible medications  | [36 – 37] |
| 10 | Opportunity Analysis | A general analysis of identifying, evaluating, comparing, and interpreting opportunities in terms of merits and demerits.  | [38]      |
| 11 | Strategy Analysis    | Analysing a problem and identifying a suitable strategy to solve it optimally by evaluating the resources required.  | [39 – 40] |
| 12 | Performance Analysis | Analysing the performance of a system including human beings in organizations or society by identifying suitable parameters, and comparing and evaluating the performance in terms of productivity, efficiency, and effectiveness. | [41 – 42] |
| 13 | Country Analysis     | Analysing, comparing, and evaluating a country in terms of various factors & features and interpretation of a particular issue favourable or unfavourable.   | [43 - 44] |
| 14 | Situation Analysis   | Analysis of a situation related to a problem in terms of various suitable analysis frameworks.   | [45 - 46] |

|    |                   |  |           |
|----|-------------------|--|-----------|
| 15 | System Analysis   | Analysis of a system in terms of its inputs, outputs, processes, and environment to study its performance and compare it with an ideal hypothetical system to find further improvement opportunities.      | [47 - 48] |
| 16 | Material Analysis | Analysing a material in terms of its physical, chemical and biological characteristics and comparing it with anticipated ideal material as well as other competitive material to plan further improvement. | [49 - 50] |

## Various analysis frameworks used for Exploratory Research

Various analysis frameworks are developed by many researchers to address the analysis, comparison, and evaluation of problems, issues, situations, and systems. Many of them are developed recently during last fifty years. Some of such analysis & evaluation frameworks are listed in Table 6 with suitable references.

**Table 6:** Some of the commonly used analysis frameworks in exploratory research with references

| Sl. No. | Analysis Frameworks                  | References  |
|---------|--------------------------------------|-------------|
| 1       | SWOC Analysis Framework              | [51 - 55]   |
| 2       | ABCD Analysis Framework              | [56 - 70]   |
| 3       | PESTLE Analysis Framework            | [71- 76]    |
| 4       | Six Thinking Hats Analysis Framework | [77 - 83]   |
| 5       | 7-P Analysis Framework               | [84 - 86]   |
| 6       | McKinsey 7-S Analysis Framework      | [87 - 90]   |
| 7       | Innovation Analysis Framework        | [91 - 95]   |
| 8       | Strategy Analysis Framework          | [96 - 100]  |
| 9       | 7-KPIs Analysis Framework            | [101 - 104] |
| 10      | ABCDEF Analysis Framework            | [105 - 106] |
| 11      | Performance Analysis Framework       | [107 - 109] |

|    |   |             |
|----|---|-------------|
| 12 | Predictive/Future Analysis Framework    | [110 – 114] |
| 13 | Porter's Five Forces Analysis Framework | [115 – 120] |
| 14 | VRIO Analysis Framework                 | [121 – 122] |
| 15 | Value Chain Analysis Framework          | [123 - 125] |
| 16 | Balanced Score Card Framework           | [126 – 128] |

## SUGGESTIONS

1. The exploratory research method is a systematic research method used over long period as one of the research methods for an identified research methodology.
2. Exploratory research method, unlike experimental and empirical research methods, is simple, low cost, and less time consumable, and customizable research method.
3. Exploratory research method, due to its merits and benefits, becoming popular in the research community and can be used by entry-level researchers and advanced-level researchers who have constraints in collecting primary data through the use of sophisticated instruments or use of complex questionnaires.
4. By using advanced research skills like analysing, comparing, evaluating, and systematically interpreting the information related to a given problem, issue, or system, one can develop new interpretation by using one or more suitable research analysis frameworks.
5. Research models under exploratory research methods are becoming more and more popular and widely accepted in the case of industry analysis, company analysis, leadership analysis, patent analysis, technology analysis, performance analysis, product and service analysis, material analysis, disease analysis, etc. Exploratory research method finding importance in both micro and mega research projects leading to single scholarly paper publication to PhD thesis.
6. Recently developed ABCD analysis framework and Patent analysis frameworks, are extended exploratory



research method to basic sciences, engineering sciences, material sciences, and medical sciences and deepen its root to social and management science research.

## CONCLUSION

An overview of various research methods used in a systematic research methodology with emphasis on the exploratory research method is discussed. Insights of exploratory research methods with characteristics and types are described in detail. Some of the new research models & procedures under the exploratory research method along with different possible analysis frameworks are described with special emphasis on research case studies as a type of exploratory research. Based on the analysis, suggestions are provided to the young and experienced researchers on the use of exploratory research models for a new interpretation of existing information for supporting decision-making process.

## REFERENCES

1. Aithal, P.S. and Aithal, S. 2019. New Directions in Scholarly Research—Some Fearless Innovations & Predictions for 21st Century Research. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 4(1): 1-19.
2. Aithal, A. and Aithal, P.S. 2020. Development and validation of survey questionnaire & experimental data—a systematical review-based statistical approach. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 5(2): 233-251.
3. Kaae, S., Søndergaard, B., Haugbølle, L.S. and Traulsen, J.M. 2010. Development of a qualitative exploratory case study research method to explore sustained delivery of cognitive services. *Pharmacy World & Science*, 32(1): 36-42.
4. Awwad, A. and Akroush, D.M.N. 2016. New product development performance success measures: an exploratory research. *EuroMed Journal of Business*, 11(1): 2-29.

5. Makri, C. and Neely, A. 2021. Grounded theory: A guide for exploratory studies in management research. *International Journal of Qualitative Methods*, **20**(1): 1-14.
6. Boschi, R.A.A. 1982. Modelling exploratory research. *European Journal of Operational Research*, **10**(3): 250-259.
7. Mbaka, N. and Isiramen, O.M. 2021. The Changing Role of An Exploratory Research In Modern Organisation. *GPH-International Journal of Business Management*, **4**(12): 27-36.
8. Swedberg, R. 2020. Exploratory research. *The production of knowledge: Enhancing progress in social science*, Cambridge University Press, pp. 17-41.
9. Rowley, J. 2002. Using case studies in research. *Management Research News*, **25**(1): 16-27.
10. Patton, E. and Appelbaum, S.H. 2003. The case for case studies in management research. *Management Research News*, **26**(5): 60-71.
11. Aithal, P.S. 2017. Industry Analysis–The First Step in Business Management Scholarly Research. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, **1**(1): 1-13.
12. Sony, M. and Aithal, P.S. 2020. Practical lessons for engineers to adapt towards industry 4.0 in Indian engineering industries. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, **4**(2): 86-97.
13. Murthy, A. and Nethravathi, P.S. 2021. The Evolution of the E-Vehicle Industry and its Path Towards Setting up Dominance in Automobile Industry-A Case Study. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, **5**(2): 38-49.
14. D'Silva, R.J. 2021. A Case Study of Cashew Industry in Karnataka. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, **5**(2): 329-341.
15. Aithal, P.S. 2017. Company Analysis–The Beginning Step for Scholarly Research. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, **1**(1): 1-18.

16. Aithal, P.S. 2017. An effective method of developing business case studies based on company analysis. *International Journal of Engineering Research and Modern Education (IJERME)*, **2**(1): 16-27.
17. Kumari, P. and Aithal, P.S. 2020. Growth & Fate Analysis of Mangalore International Airport–A Case Study. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, **4**(2): 71-85.
18. Raj, K. and Aithal, P.S. 2018. A ‘Desi’ Multinational–A Case Study of Hindustan Unilever Limited. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, **2**(1): 1-12.
19. Madhushree, R.R., Kumar, A. and Aithal, P.S. 2018. Business strategy of top Indian IT company: Mindtree. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, **2**(1): 22-36.
20. Salins, M., Mendon, S. and Aithal, P.S. 2019. A Comprehensive Analysis of Top Indian Cosmetic Company: LAKME. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, **3**(2): 79-90.
21. Robinson, V.M., Lloyd, C.A. and Rowe, K.J. 2008. The impact of leadership on student outcomes: An analysis of the differential effects of leadership types. *Educational Administration Quarterly*, **44**(5): 635-674.
22. Ferris, S.P., Javakhadze, D. and Rajkovic, T. 2019. An international analysis of CEO social capital and corporate risk-taking. *European Financial Management*, **25**(1): 3-37.
23. Hair, J.F., Money, A.H., Samouel, P. and Page, M. 2007. Research methods for business. *Education + Training*, **49**(4): 336-337.
24. Halliday, S., Badenhorst, K. and Von Solms, R. 1996. A business approach to effective information technology risk analysis and management. *Information Management & Computer Security*, **4**(1): 19-31.

25. Chen, Y. and Xie, J. 2005. Third-party product review and firm marketing strategy. *Marketing Science*, **24**(2): 218-240.
26. Elias, A., Barona, A., Arreguy, A., Rios, J., Aranguiz, I. and Penas, J. 2002. Evaluation of a packing material for the biodegradation of H<sub>2</sub>S and product analysis. *Process Biochemistry*, **37**(8): 813-820.
27. Usak, M., Kubiato, M., Shabbir, M.S., Viktorovna Dudnik, O., Jermisittiparsert, K. and Rajabion, L. 2020. Health care service delivery based on the Internet of things: A systematic and comprehensive study. *International Journal of Communication Systems*, **33**(2): e4179.
28. Punel, A., Hassan, L.A.H. and Ermagun, A. 2019. Variations in airline passenger expectation of service quality across the globe. *Tourism Management*, **75**(1): 491-508.
29. Bolisetty, S., Peydayesh, M. and Mezzenga, R. 2019. Sustainable technologies for water purification from heavy metals: review and analysis. *Chemical Society Reviews*, **48**(2): 463-487.
30. Niranjanamurthy, M., Nithya, B.N. and Jagannatha, S.J.C.C. 2019. Analysis of Blockchain technology: pros, cons and SWOT. *Cluster Computing*, **22**: 14743-14757.
31. Reddy, B. and Aithal, P.S. 2020. Blockchain as a disruptive technology in healthcare and financial services-A review-based analysis on current implementations. *International Journal of Applied Engineering and Management Letters (IJAEML)*, **4**(1): 142-155.
32. Aithal, P.S. and Aithal, S. 2022. Exploring the Role of ICCT Underlying Technologies in Environmental and Ecological Management. In *Environmental Informatics: Challenges and Solutions* (pp. 15-30). Singapore: Springer Nature Singapore.
33. Aithal, P.S. 2019. Information communication & computation technology (ICCT) as a strategic tool for industry sectors. *International Journal of Applied Engineering and Management Letters (IJAEML)*, **3**(2): 65-80.

34. Aithal, S. and Aithal, P. S. (2019). How to Customize Higher Education at UG & PG levels using Patent Analysis & Company Analysis as New Research Methods in Technology, Health Sciences & Management Education. *Health Sciences & Management Education (January 30, 2019)*. In *Information Technology and Education, Challenges and Opportunities of Smarter Learning Systems*, New Delhi Publishers, India, 25-59.
35. Aithal, P.S. and Aithal, S. 2018. Patent Analysis as a New Scholarly Research Method. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, **2**(2): 33-47.
36. Pybus, O.G. and Rambaut, A. 2009. Evolutionary analysis of the dynamics of viral infectious disease. *Nature Reviews Genetics*, **10**(8): 540-550.
37. Indrakumari, R., Poongodi, T. and Jena, S.R. 2020. Heart disease prediction using exploratory data analysis. *Procedia Computer Science*, **173**: 130-139.
38. Falcone, P.M. and Sica, E. 2019. Assessing the opportunities and challenges of green finance in Italy: An analysis of the biomass production sector. *Sustainability*, **11**(2): 517-524.
39. Banka, M., Tien, N.H., Dao, M.T.H. and Minh, D.T. 2022. Analysis of business strategy of real estate developers in Vietnam: the application of QSPM matrix. *International Journal of Multidisciplinary Research and Growth Evaluation*, **3**(1): 188-196.
40. Igor Ansoff, H. 1986. Competitive strategy analysis on the personal computer. *Journal of Business Strategy*, **6**(3): 28-36.
41. Ding, Z., Hou, H., Yu, G., Hu, E., Duan, L. and Zhao, J. 2019. Performance analysis of a wind-solar hybrid power generation system. *Energy Conversion and Management*, **181**(1): 223-234.
42. Carlstedt, D. and Asp, L.E. 2020. Performance analysis framework for structural battery composites in electric vehicles. *Composites Part B: Engineering*, **186**: 107822, 01-30.

43. Merigó, J.M., Cancino, C.A., Coronado, F. and Urbano, D. 2016. Academic research in innovation: a country analysis. *Scientometrics*, **108**(1): 559-593.
44. Barth, J.R., Nolle, D.E., Phumiwasana, T. and Yago, G. 2003. A cross-country analysis of the bank supervisory framework and bank performance. *Financial Markets, Institutions & Instruments*, **12**(2): 67-120.
45. Mitchell, J.C. 1983. Case and situation analysis. *The Sociological Review*, **31**(2), 187-211.
46. Mansuri, F.M. 2020. Situation analysis and an insight into assessment of pandemic COVID-19. *Journal of Taibah University Medical Sciences*, **15**(2): 85-93.
47. Aithal, P.S. 2021. Ideal Technology & its Realization Opportunity. *Chapter, 3*: 83-216.
48. Aithal, P.S. 2021. Ideal Business System & its Realization Opportunity. *Chapter, 4*: 217-260.
49. Kumar Mishra, A. and Aithal, P.S. 2022. Assessing the Magnitude of Waste Material Using Lean Construction. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, **6**(1): 578-589.
50. Juenger, M.C., Snellings, R. and Bernal, S.A. 2019. Supplementary cementitious materials: New sources, characterization, and performance insights. *Cement and Concrete Research*, **122**: 257-273.
51. Aithal, P.S. and Kumar, P.M. 2015. Applying SWOC analysis to an institution of higher education. *International Journal of Management, IT and Engineering*, **5**(7): 231-247.
52. Aithal, A., Aithal, S. and Aithal, P.S. Case Study on Certara's Simcyp PBPK Simulator to Eliminate Lengthy Clinical Trials. *International Journal of Health Sciences and Pharmacy (IJHSP)*, **6**(2): 69-109.
53. Netravathi, P.S., Maiya, A.K. and Aithal, P.S. 2022. How to align the Vision, Mission, and Objectives of HEI with the

- Leadership and Governance—A Case of Srinivas University, India. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, 6(2): 50-66.
54. Aithal, P.S. and Kumar, P.M. 2016. Analysis of choice-based credit system in higher education. *International Journal of Engineering Research and Modern Education (IJERME)*, 1(1): 278-284.
  55. Frederick, D.P. and Parappagoudar, S.K. 2021. SWOC Analysis of Zomato-A Case of Online Food Delivery Services. *International Research Journal of Modernization in Engineering Technology and Science*, 3(3): 537-544.
  56. Aithal, P.S. 2016. Study on ABCD analysis technique for business models, business strategies, operating concepts & business systems. *International Journal in Management and Social Science*, 4(1): 95-115.
  57. Aithal, P.S., Shailashree, V. and Kumar, P.M. 2015. A new ABCD technique to analyze business models & concepts. *International Journal of Management, IT and Engineering*, 5(4): 409-423.
  58. Aithal, P.S. 2017. ABCD Analysis as Research Methodology in Company Case Studies. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 2(2): 40-54.
  59. Aithal, P.S. 2017. ABCD Analysis of Recently Announced New Research Indices. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 1(1): 65-76.
  60. Shenoy, V. and Aithal, P.S. 2016. ABCD Analysis of On-line Campus Placement Model. *IRA-International Journal of Management & Social Sciences*, 5(2): 227-244.
  61. Aithal, P.S., Shailashree, V. and Kumar, P.M. 2016. ABCD analysis of Stage Model in Higher Education. *International Journal of Management, IT and Engineering*, 6(1): 11-24.
  62. Shenoy, V. and Aithal, P.S. 2017. Quantitative ABCD Analysis of IEDRA Model of Placement Determination. *Int. J. Case Studies in Business, IT and Education (IJCSBE)*, 1(2): 103-113.

63. Aithal, P.S., Shailashree, V. and Kumar, P.M. 2015. Application of ABCD Analysis Model for Black Ocean Strategy. *International Journal of Applied Research*, 1(10): 331-337.
64. Aithal, P.S. and Kumar, P.M. 2016. CCE Approach through ABCD Analysis of 'Theory A' on Organizational Performance. *International Journal of Current Research and Modern Education (IJCRME)*, 1(2): 169-185.
65. Aithal, A. and Aithal, P.S. 2017. ABCD analysis of task shifting—an optimum alternative solution to professional healthcare personnel shortage. *International Journal of Health Sciences and Pharmacy (IJHSP)*, 1(2): 36-51.
66. Aithal, S. and Aithal, P.S. 2016. ABCD analysis of Dye-doped Polymers for Photonic Applications. *IRA-International Journal of Applied Sciences*, 4(3): 358-378.
67. Raj, K. and Aithal, P.S. 2018. Generating Wealth at the Base of the Pyramid—a Study Using ABCD Analysis Technique. *International Journal of Computational Research and Development (IJCRD)*, 3(1): 68-76.
68. Mendon, S. and Aithal, P.S. 2022. Quantitative ABCD Analysis of Organic Food Product and its Impact on Purchase Intention. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 7(1): 254-278.
69. Aithal, P.S., Shailashree, V.T. and Kumar, P.M. 2016. Analysis of ABC Model of Annual Research Productivity using ABCD Framework. *International Journal of Current Research and Modern Education (IJCRME)*, 1(1): 846-858.
70. Kumari, P. and Aithal, P.S. 2022. Stress Coping Mechanisms: A Quantitative ABCD Analysis. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, 6(2): 268-291.
71. Aithal, P.S., Shailashree, V.T. and Kumar, P.M. 2016. The study of new national institutional ranking system using ABCD framework. *International Journal of Current Research and Modern Education (IJCRME)*, 1(1): 389-402.



72. Achinas, S., Horjus, J., Achinas, V. and Euverink, G.J.W. 2019. A PESTLE analysis of biofuels energy industry in Europe. *Sustainability*, **11**(21): 5981, 1-12.
73. Aithal, P.S. 2017. A critical study on Various Frameworks used to analyse International Business and its Environment. *International Journal of Applied Engineering and Management Letters (IJAEML)*, **1**(2): 78-97.
74. Mihailova, M. 2020. The state of agriculture in Bulgaria–PESTLE analysis. *Bulgarian Journal of Agricultural Science*, **26**(5): 935-943.
75. Nandonde, F.A. 2019. A PESTLE analysis of international retailing in the East African Community. *Global Business and Organizational Excellence*, **38**(4): 54-61.
76. Thomas, P.J.M., Sandwell, P., Williamson, S.J. and Harper, P.W. 2021. A PESTLE analysis of solar home systems in refugee camps in Rwanda. *Renewable and Sustainable Energy Reviews*, **143**: 110872.
77. Frederick, D.P. and Parappagoudar, S.K. 2021. A Descriptive Analysis on Sustainable Business Strategy of Online Food Service Industry. *International Research Journal of Modernization in Engineering Technology and Science*, **3**(3): 543-554.
78. Aithal, P.S. and Kumar, P.M. 2017. Ideal analysis for decision making in critical situations through six thinking hats method. *International Journal of Applied Engineering and Management Letters (IJAEML)*, **1**(2): 1-9.
79. Aithal, P.S., Kumar, P.M. and Shailashree, V. 2016. Factors & elemental analysis of six thinking hats technique using abcd framework. *International Journal of Advanced Trends in Engineering and Technology (IJATET)*, **1**(1): 85-95.
80. Aithal, P.S. and Kumar, P.M. 2016. Using six thinking hats as a tool for lateral thinking in organizational problem solving. *International Journal of Engineering Research and Modern Education (IJERME)*, **1**(2): 225-234.

81. Aithal, P.S. and Kumar, P.M. 2017. Integrating theory and six thinking hats technique for improved organizational performance. *International Journal of Applied Engineering and Management Letters (IJAEML)*, **1**(2): 66-77.
82. Aithal, P.S. and Kumar, P.M. 2017. Lateral thinking in managerial decision making through six thinking hats technique. *International Journal of Scientific Research and Modern Education (IJSRME)*, **2**(1): 53-58.
83. Rangi, P.K. and Aithal, P.S. 2020. Academic Institutions Risk Decisions using Six Thinking Hats based Analysis. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, **4**(2): 270-279.
84. Chien, C.W. 2021. A case study of the use of the Six Thinking Hats to enhance the reflective practice of student teachers in Taiwan. *Education 3-13*, **49**(5): 606-617.
85. Paul, J. and Mas, E. 2020. Toward a 7-P framework for international marketing. *Journal of Strategic Marketing*, **28**(8): 681-701.
86. Paul, J. 2020. Toward a 7-P Framework for Entrepreneurial Internationalization. *Academy of Management Global Proceedings*, **47**: 1-12.
87. Schlossberg, N.K. 1963. A sociological framework for evaluating guidance education. *The Personnel and Guidance Journal*, **42**(3): 285-289.
88. Chmielewska, M., Stokwiszewski, J., Markowska, J. and Hermanowski, T. 2022. Evaluating Organizational Performance of Public Hospitals using the McKinsey 7-S Framework. *BMC Health Services Research*, **22**(1): 1-12.
89. Tracey, J.B. and Blood, B. 2012. The Ithaca Beer Company: A case study of the application of the McKinsey 7-S framework. <https://ecommons.cornell.edu/handle/1813/71150>.
90. Alam, P.A. 2017. Measuring organizational effectiveness through performance management system and Mckinsey's 7 S model. *Asian Journal of Management*, **8**(4): 1280-1286.

91. Paquibut, R.Y. 2017. Building Research Ethos from the Ground up Using McKinsey 7-S Framework: The Case of the Modern College of Business and Science. *Asian Journal of Education and Training*, 3(2): 92-96.
92. Aithal, P.S. and Aithal, S. 2019. Innovation in B. Tech. Curriculum as B. Tech. (Hons) by integrating STEAM, ESEP & IPR features. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, 3(1): 56-71.
93. Aithal, S. and Aithal, P.S. 2021. Green nanotechnology innovations to realize UN sustainable development goals 2030. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 5(2): 96-105.
94. Aithal, P.S. 2016. Innovations in student-centric learning—A study of top business schools in India. *International Journal of Engineering Research and Modern Education (IJERME)*, 1(1): 298-306.
95. Mostafavi, Ali, *et al.* 2011. Exploring the dimensions of systems of innovation analysis: A system of systems framework. *IEEE Systems Journal*, 5(2): 256-265.
96. Huang, C., Amorim, C., Spinoglio, M., Gouveia, B. and Medina, A. 2004. Organization, programme and structure: an analysis of the Chinese innovation policy framework. *r&d Management*, 34(4): 367-387.
97. Solberg, C.A. 1997. A framework for analysis of strategy development in globalizing markets. *Journal of International Marketing*, 5(1): 9-30.
98. Aithal, P.S. and Aithal, S. 2020. Conceptual analysis on higher education strategies for various tech-generations. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 5(1): 335-351.
99. Aithal, P.S. 2016. The concept of ideal strategy and its realization using white ocean mixed strategy. *International Journal of Management Sciences and Business Research*, 5(4): 171-179.

100. Igor Ansoff, H. 1986. Competitive strategy analysis on the personal computer. *Journal of Business Strategy*, **6**(3): 28-36.
101. Porter, M.E. 1980. Industry structure and competitive strategy: Keys to profitability. *Financial Analysts Journal*, **36**(4): 30-41.
102. Anand, N. and Grover, N. 2015. Measuring retail supply chain performance: Theoretical model using key performance indicators (KPIs). *Benchmarking: An International Journal*. **22**(1): 135-166.
103. Hristov, I., Appolloni, A. and Chirico, A. 2022. The adoption of the key performance indicators to integrate sustainability in the business strategy: A novel five-dimensional framework. *Business Strategy and the Environment*, **31**(7): 3216-3230.
104. Domínguez, E., Pérez, B., Rubio, Á.L. and Zapata, M.A. 2019. A taxonomy for key performance indicators management. *Computer Standards & Interfaces*, **64**: 24-40.
105. Vinajera-Zamora, A., Gaus, N. and Rodríguez-Martínez, Y. 2023. Framework and analysis of key performance indicators in Cuban higher education. *Journal of Hispanic Higher Education*, **22**(2): 205-218.
106. Aithal, P.S. and Aithal, S. 2018. A New Method of Scholarly Research-Patent Analysis. In *Proceedings of Conference - Exploring Avenues in Banking, Management, IT, Education & Social Sciences*, pp. 69-83. ISBN No.: 978-93-5321-508-8.
107. Aithal, S. and Aithal, P.S. 2019. How to Customize Higher Education at UG & PG levels using Patent Analysis & Company Analysis as New Research Methods in Technology, Health Sciences & Management Education. *Health Sciences & Management Education (January 30, 2019)*. In *Information Technology and Education, Challenges and Opportunities of Smarter Learning Systems*, New Delhi Publishers, India, pp. 25-59.
108. Sim, J., Dasgupta, A., Kim, H. and Vuduc, R. 2012. A performance analysis framework for identifying potential benefits in GPGPU applications. In *Proceedings of the 17<sup>th</sup>*

ACM SIGPLAN symposium on Principles and Practice of Parallel Programming, pp. 11-22.

109. Polatajko, H.J., Mandich, A. and Martini, R. 2000. Dynamic performance analysis: A framework for understanding occupational performance. *The American Journal of Occupational Therapy*, **54**(1): 65-72.
110. Lai, I.K.W. and Hitchcock, M. 2015. Importance–performance analysis in tourism: A framework for researchers. *Tourism Management*, **48**(1): 242-267.
111. Ramesh, T.R., Lilhore, U.K., Poongodi, M., Simaiya, S., Kaur, A. and Hamdi, M. 2022. Predictive analysis of heart diseases with machine learning approaches. *Malaysian Journal of Computer Science*, pp. 132-148.
112. Harker, P.T. 1985. The state of the art in the predictive analysis of freight transport systems. *Transport Reviews*, **5**(2): 143-164.
113. Aithal, P.S. and Aithal, S. 2020. Conceptual analysis on higher education strategies for various tech-generations. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, **5**(1): 335-351.
114. Aithal, P.S. 2016. Student Centric Curriculum Design and Implementation -Challenges & Opportunities in Business Management & IT Education. *IRA International Journal of Education and Multidisciplinary Studies*, **4**(3): 423 – 437.
115. Aithal, P.S. and Aithal, S. 2019. Management of ICCT underlying technologies used for digital service innovation. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, **4**(2): 110-136.
116. Grundy, T. 2006. Rethinking and reinventing Michael Porter's five forces model. *Strategic Change*, **15**(5): 213-229.
117. Karagiannopoulos, G.D., Georgopoulos, N. and Nikolopoulos, K. 2005. Fathoming Porter's five forces model in the internet era. *Info*, **7**(6): 66-76.

118. Wu, K.J., Tseng, M.L. and Chiu, A.S. 2012. Using the Analytical Network Process in Porter's Five Forces Analysis—Case Study in Philippines. *Procedia-Social and Behavioral Sciences*, **57**(1): 1-9.
119. Dobbs, M.E. 2014. Guidelines for applying Porter's five forces framework: a set of industry analysis templates. *Competitiveness Review*, **24**(1): 32-45.
120. Siaw, I. and Yu, A. 2004. An analysis of the impact of the internet on competition in the banking industry, using Porter's five forces model. *International Journal of Management*, **21**(4): 514-527.
121. Pringle, J. and Huisman, J. 2011. Understanding Universities in Ontario, Canada: An Industry Analysis Using Porter's Five Forces Framework. *Canadian Journal of Higher Education*, **41**(3): 36-58.
122. Lin, C., Tsai, H.L., Wu, Y.J. and Kiang, M. 2012. A fuzzy quantitative VRIO-based framework for evaluating organizational activities. *Management Decision*, **50**(8): 1396-1411.
123. Simão, J. 2010. An extended VRIO model as a framework for sustainable tourism planning. *Sustainable Tourism IV*, **139**: 87-97.
124. Zamora, E.A. 2016. Value chain analysis: A brief review. *Asian Journal of Innovation and Policy*, **5**(2): 116-128.
125. Rawlins, J.M., De Lange, W.J. and Fraser, G.C. 2018. An ecosystem service value chain analysis framework: a conceptual paper. *Ecological Economics*, **147**(1): 84-95.
126. Fearne, A., Martinez, M.G. and Dent, B. 2012. Dimensions of sustainable value chains: implications for value chain analysis. *Supply Chain Management: An International Journal*, **17**(6): 575-581.
127. Nikolaou, I.E. and Tsalis, T.A. 2013. Development of a sustainable balanced scorecard framework. *Ecological Indicators*, **34**(1), 76-86.

128. Manville, G. 2007. Implementing a balanced scorecard framework in a not for profit SME. *International Journal of Productivity and Performance Management*, **56**(2): 162-169.
129. Rajesh, R., Pugazhendhi, S., Ganesh, K., Ducq, Y. and Koh, S.L. 2012. Generic balanced scorecard framework for third party logistics service provider. *International Journal of Production Economics*, **140**(1): 269-282.