

Agility adaptability and alignment in start-ups

Start-ups

Aswathy Sreenivasan and M. Suresh

Amrita School of Business, Amrita Vishwa Vidyapeetham, Coimbatore, India

Abstract

Purpose – When coping with uncertainties, three characteristics distinguish firms: agility, adaptability and alignment (triple-A). Based on significant field research, the triple-A highlights the significance of coordinating agility, adaptability and alignment. Start-ups are facing a lot of challenges in this turbulent environment. However, this sector is undergoing a major transformation. Agility, adaptability and alignment concepts have had a major influence on the supply chain, but their implementation in start-ups has been less visible. This paper aims to identify, analyze and categorize the enablers for agility, adaptability and alignment in start-ups using the total interpretive structural modeling (TISM) approach.

Design/methodology/approach – In addition to the scheduled interview, a closed-ended questionnaire was used to collect data. To identify how the factors interact, the TISM technique is used, and the Matriced'Impacts Croises-Multiplication Applique' and Classment method is used to rank and categorize the agility, adaptability and alignment enablers.

Findings – This study identified ten agility, adaptability and alignment factors for start-ups. It has been found that the key importance should be given to management involvement, conflict management, collaboration and information integration.

Research limitations/implications – This study primarily focused on the agility, adaptability and alignment factors in start-ups.

Practical implications – This study will help academics and key stakeholders understand the aspects that lead to agility, adaptability and alignment in start-ups.

Originality/value – Agility, adaptability and alignment concepts have had a major influence on the supply chain, but their implementation in start-ups has been less visible. Therefore, this is a novel attempt in this industry's agility, adaptability and alignment.

Keywords Agility, Adaptability and alignment, Start-ups, Customer value, Visibility and versatility, Total interpretive structural modeling

Paper type Research paper

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1. Introduction

Staying stagnant during a shift is one of the weakest strategic alternatives, particularly these days when doors of chances are shrinking and closing. The speed with which start-ups accept, react to and implement initiatives is just as significant as the actual reaction. As a result, agility, adaptability and alignment (triple-A) are critical for start-ups' success. Triple-A may alter not simply the job they accomplish but, more crucially, how start-ups operate and think. The capacity to capitalize on possibilities created by crises, such as speeding change, boosting resilience and finding lessons learned, strongly depends on how well management supports an enterprise-wide attitude centered on agility, adaptability and alignment. Only by doing so before, during and after a crisis – will the start-ups be able to build better and sustain alignment between portfolio and strategy execution.



Firms functioning in the globalized world must adapt promptly to external developments and difficulties, particularly ambiguity (Prater *et al.*, 2001; Lee, 2002). When coping with these difficulties, three characteristics distinguish firms:

- (1) agility;
- (2) adaptability; and
- (3) alignment (Lee, 2004; Dubey *et al.*, 2018).

Based on significant field research, the triple-A highlights the significance of coordinating agility, adaptability and alignment (Lee, 2004). Agility allows a start-up to respond to short-term changes, whereas adaptability allows for long-term market movements. Finally, aligning objectives and incentives brings the entire process together to serve the ultimate consumer (Feizabadi *et al.*, 2021). Agility, adaptability and alignment are effective tactics for dealing with difficulties like rising demand and supplier uncertainties, shortened technology and product cycle, having several outsourced collaborators and harmonizing all of their objectives and demands.

As evidence of the triple-A, Lee's original work has received over 1,700 citations, demonstrating that agility, adaptability and alignment remain critical to supply chain management in today's corporate situations (Feizabadi *et al.*, 2019). Although there is an immense study on agility, adaptability and alignment in the supply chain (Feizabadi *et al.*, 2019; Sheel and Nath, 2019; Dubey *et al.*, 2015; Jermisittiparsert and Kampoomprasert, 2019; Whitten *et al.*, 2012; Escamilla *et al.*, 2021), research on agility, adaptability and alignment in start-ups has been less viable so far. This paper aims to identify, analyze and categorize the enablers for agility, adaptability and alignment in start-ups using the Total Interpretive Structural Modelling (TISM) approach. The TISM technique was used in this study to examine the inter-relationships between the enablers. The primary focus of this research is on the facilitators of agility, adaptability and alignment in start-ups. This research will help managers and practitioners understand enabler relationships and identify essential enablers for implementing agility, adaptability and alignment in start-ups. This is the first attempt to use the TISM technique to examine the interdependence of enablers for agility, adaptability and alignment in start-ups. The main objectives of the paper are:

- to identify the factors influencing agility, adaptability and alignment in start-ups;
- to analyze interrelationships among these factors; and
- to categorize and rank the factors based on their driving and dependence power.

In the past, many scholars have discussed agility, adaptability and alignment in the supply chain. But, none of them have developed a theoretical framework of agility, adaptability and alignment in start-ups. Therefore, TISM is used to create the framework, particularly in start-ups by the following research questions (RQ):

- RQ1. What are the agility, adaptability and alignment factors for implementing in start-ups?
- RQ2. How do they influence one another and the agility, adaptability and alignment in start-ups?
- RQ3. Which factors drive others and which factors depend on others?
- RQ4. Can the priority of each of these factors be measured?

The remaining manuscript is as follows. Section 2 reviews the literature on agility, adaptability and alignment. Section 3 concerns methodology, including sample techniques and TISM stages. Section 4 includes the results and discussion. Section 5 of the paper talks about the study's managerial/practical and theoretical contribution. Section 6 covers the conclusion, limitations, and future research.

2. Literature review

2.1 Past literature on triple-A

2.1.1 Agility. Agility is the ability of the start-ups to respond quickly and effectively to environmental and market changes (Lee, 2004). Start-ups must improve their capacity to proactively deal with uncertain events because of increasing unpredictability in the present business environment (Feizabadi *et al.*, 2021). Flexibility and quickness are the essential elements of agility (Swafford *et al.*, 2006). According to prior studies, agility enhances operational and interpersonal performance (Gligor and Holcomb, 2014). Agility has also been connected to enhanced financial efficiency (Gligor *et al.*, 2015).

2.1.2 Adaptability. The capacity of a company to modify its resources in response to long-term variations is known as adaptability (Feizabadi *et al.*, 2021). Both agility and adaptability require a reaction to change. Still, they differ in how they emphasize different types of transitions (such as short- versus long-term) and various kinds of responses (such as quick against one that does not emphasize speed) (Choi *et al.*, 2001). Thus, rapid product innovation is one key strategy promoting adaptability (Eisenhardt and Tabrizi, 1995). According to research, flexibility can greatly boost productivity outcomes and support long-term firm sustainability (Aboah *et al.*, 2019).

2.1.3 Alignment. Alignment is the ability of the start-ups to ensure equitable distribution of risks, gains and costs among all the participants (Lee, 2004). Alignment encapsulates the scope to which the firm cooperates with its stakeholders to meet its performance targets, as opposed to agility and adaptability, which respectively concentrate on the firm's capacity to respond or react to short- and long-term variations (Feizabadi *et al.*, 2021). By encouraging value co-creation, alignment aims to increase customer value (Narayanan and Raman, 2004).

2.1.4 Integrating the A's – triple-A. Following Lee's initial research, the studies have conclusively linked the integration of the three A's to company performance. Patrucco and Kähkönen (2021) connect the data to three essential skills for supply chains operating in the post-COVID-19 pandemic business world: agility, adaptability and alignment. The interactions and interdependencies between agility, adaptability and alignment skills are examined in their nature and effects (Feizabadi *et al.*, 2021). Garrido-Vega *et al.* (2021) examine how the firm's plan and competitive climate impact the adoption of the triple-A capabilities. Huma and Ahmed (2022) examine the triple-A characteristics and how they simultaneously affect the three triple-A elements. Feizabadi *et al.* (2019) discussed that only a small amount of research had been done on the triple-A supply chain, including agility, adaptability and alignment. Using current research and resources orchestration theory, the study intends to provide a comprehensive model of the triple-A supply chain's precursors and consequences, enabling academics and professionals to measure and prioritize triple-A capabilities. Sheel and Nath (2019) investigated how blockchain technology may improve supply chain "adaptability," "alignment" and "agility," all of which improve competitive edge and company performance. Dubey *et al.* (2015) discussed that scholars had made significant contributions to the fields of supply chain agility, adaptability and alignment. They did a thorough literature review to discover factors and associated items to develop a pretested systematic survey. Escamilla *et al.* (2021) demonstrated how urban nano stores can improve their supply chain's "agility," "adaptability" and "alignment" to compete, and

how rural nano stores can change their operations to improve accessibility and affordability. [Dubey et al. \(2018\)](#) investigated how and when firms develop agility, flexibility and alignment as different supply chain traits to obtain a long-term market advantage. [Jermisittiparsert and Kampoomprasert \(2019\)](#) looked into the link between agility, flexibility and alignment as determinants. [Dubey and Gunasekaran \(2016\)](#) established a “sustainable humanitarian supply chain (SHSC)” definition and empirically validated it. [Whitten et al. \(2012\)](#) created a triple-A supply chain performance model that considers triple-A supply chain status as a predictor of supply chain performance and supply chain performance as a predictor of organizational success. [Salas-Lopez et al. \(2014\)](#) described the method taken by a big academic tertiary care hospital in designing and executing alignment and integration models with its collaboration-ready physicians and physician groups. [Ćwiklicki et al. \(2020\)](#) identified the critical variables of the health-care system’s adaptive capacity to respond to the fourth industrial revolution’s consequences. [Kyrö et al. \(2019\)](#) presented an organized way to expand adaptability in hospital retrofits, with recommendations for the best time and scope for various adaptability tactics. [Nyamu et al. \(2015\)](#) used a conceptual research framework to investigate organizational characteristics that may influence collaboration in developing nations to facilitate telemedicine adoption. [Qumer and Henderson-Sellers \(2008\)](#) described agile approaches that are frequently viewed as ways to avoid the overheads associated with traditional software development settings. Few firms, however, are psychologically or technically capable of quickly and effectively adopting an agile approach. Here, they review a few options for assisting with such a move. [Hinkelmann et al. \(2016\)](#) discussed Next Generation Enterprise Information Systems. Maintaining business and information technology (IT) alignment in a continuously changing environment is a major problem for today’s businesses. [McHugh et al. \(2015\)](#) demonstrated that agile methodologies could build regulatory-compliant software for a medical device software development project. This implementation demonstrated that agile methodologies can be successfully implemented and that advantages can be realized. [Kannan et al. \(2017\)](#) explored four practical agile co-development approaches demonstrated to be beneficial in health-care settings. [Tripp and Armstrong \(2018\)](#) classified 12 common “agile development practices” according to whether they are primarily project management or software development method oriented and then investigated how firms’ motivations for adopting agile impact the approaches they use. [Silva and Goldman \(2014\)](#) outlined the current stage of an inquiry on how firms effectively adopt agile methodologies to find a correlation between an organization’s qualities and how it efficiently converts to agile. [Gandomani and Nafchi \(2015\)](#) inferred a useful agile transition and adoption framework that appears easy and adaptable. The study aims to present the framework that has been built. [Turetken et al. \(2017\)](#) created a maturity model to help software development businesses define a scaled agile framework roadmap. [Tavis \(2017\)](#) summed up the idea that actual alignment provided a strategic benefit to an organization. It has a better understanding of what to do at any given time and can rely on others to make the appropriate decisions. [Nuottila et al. \(2016\)](#) contributed to the knowledge about adopting agile techniques in public organizations, focusing on what public organizations may experience while implementing these methods. The study aims to identify and characterize the barriers to adopting and using agile approaches in public IT projects using private software vendors. [Feibert and Jacobsen \(2019\)](#) refined and expanded technology adoption theory for a health-care logistics scenario by combining the technology–organization–environment framework with a business process management approach. The study lists and rates the elements influencing whether or not to use technologies in health-care logistical processes. [Barata et al. \(2018\)](#) built on the “ground reality” provided by medical practitioners in the research to identify risks and

potential for growth while raising knowledge of the implications. [Kwanroengjai et al. \(2014\)](#) developed an operational synchronization paradigm to ensure that business and IT elements are effectively aligned. [Nair and Dreyfus \(2018\)](#) explored the effects of regulation change on technology installation and use in the health-care sector.

The synthesis of the literature review is presented in [Table 1](#).

2.2 Research gap

The respective study gap has been recognized because of the review of the past literature. Though research on the aspects of triple-A is common in the supply chain, health-care sectors, IT and so on ([Patrucco and Kähkönen, 2021](#); [Feizabadi et al., 2021](#); [Nair and Dreyfus, 2018](#); [Feibert and Jacobsen, 2019](#); [Huma and Ahmed, 2022](#)) has been performed, a study on the factors influencing agility, adaptability and alignment in start-ups has yet to receive the necessary attention. As a result, this study has made efforts to fill this gap. The identified factors for this study are flexibility, information integration, visibility and versatility, development and launch of new products/services, collaboration, customer value, conflict management, management involvement, aggregate performance and speed of response.

3. Research methodology

Research methodology uses several data collection and analysis techniques to explore a particular subject ([Charmaz, 2014](#)). So, this section will describe the procedures used in this study's data collection and analysis. When performing scientific research, [Tashakkori and Teddlie \(2008\)](#) emphasized that choosing the right research methodologies is crucial.

A closed-ended questionnaire has been constructed to capture the effect of all discovered enablers on each other, implying factor-based pairwise comparisons. Semi-structured interviews were chosen as the data-collecting strategy because they can assist the researchers in obtaining more in-depth data from the practitioners. According to [Robson \(2002\)](#), semi-structured interviews can be highly beneficial for learning what is occurring and exploring fresh perspectives in an exploratory study. They can also be used to investigate the relationships between the factors in an exploratory study.

This research used TISM and Matriced'Impacts Croises-Multiplication Applique' and Classment (MICMAC) analysis as the data analysis techniques. TISM is a framework for understanding the interdependence of the elements that influence agility, adaptability and alignment in start-ups. A variety of factors that are indirectly and directly related to each other are organized into a thorough, systematic model by the qualitative and interpretive TISM technique, which produces solutions for complex issues ([Patil and Suresh, 2019](#); [Menon and Suresh, 2019](#); [Warfield, 1974](#)). The MICMAC approach evaluates the influence and reliance on agility, adaptability and alignment elements. According to [Attri et al. \(2013\)](#), MICMAC analysis is an indirect classification technique to evaluate the range of each factor.

3.1 Data collection method

This section thoroughly explains how the interviews were set up and how the interview data were gathered.

3.1.1 Sampling technique. "Nonprobability sampling" and "Probability sampling" are two basic types of sampling. According to [Saunders et al. \(2012\)](#), nonprobability sampling is mostly used to provide results from a particular viewpoint, whereas probability sampling is primarily used to respond to research questions or portray a phenomenon from a general perspective. Nonprobability sampling is more appropriate because this study focuses on start-ups' agility, adaptability and alignment aspects. Purposive and snowball sampling are the two sample techniques used in this investigation. Purposive sampling involves choosing

Reference	Objective	Focused dimensions
Feizabadi <i>et al.</i> (2019)	Using existing literature and resource coordination theory, the study intends to create a comprehensive framework of triple-A supply chain antecedents and consequences, allowing academicians and researchers to benchmark and prioritize triple-A capabilities	1. Alignment: innovation; conflict management; environmental uncertainty; interdependence; power; quality; socialization; strategy; supply management; aggregate performance; shareholder value; sustainability 2. Agility: demand management; speed; supply chain management. 3. Adaptability 4. Agility and adaptability: flexibility; visibility 5. Agility and alignment: information integration 6. Adaptability and alignment: customer value; innovation 7. Agility, adaptability and alignment: process integration; financial performance; operational performance; relationships 1. Agility, Adaptability and alignment: supply chain; blockchain. 2. Information technology
Sheel and Nath (2019)	The research aims to demonstrate how blockchain technology may improve supply chain adaptability, alignment and agility, strengthening competitive advantage and influencing business performance	1. Agility and alignment: information integration 2. Agility: speed; responsiveness. 3. Adaptability and alignment: collaboration 4. Adaptability: adapting to culture; limitation of supply chain partners; structural flexibility; collaboration; innovativeness; structural sensing 5. Alignment: transparency; information sharing; training and development; communication design; performance reward
Dubey <i>et al.</i> (2015)	Although researchers have made major contributions to supply chain agility, flexibility and alignment, little is known about their impact on humanitarian supply chain management practices and related links	1. Agility, adaptability and alignment: logistics support; technology; marketing strategy 2. Nano stores
Escamilla <i>et al.</i> (2021)	They show how urban nano stores can compete by increasing supply chain agility, adaptability and alignment and how rural nano stores can change their operations to improve accessibility and affordability by developing innovative business models enabled by new technologies	1. Agility, adaptability and alignment: Top management commitment
Dubey <i>et al.</i> (2018)	The research examines whether and how companies use supply chain traits, including agility, adaptability and alignment, to generate a competitive edge	1. Agility and alignment: flexibility; supply chain management 2. Supply chain
Jermisittiparsert and	The fundamental purpose of the research is to investigate the relationship between agility,	

Table 1.
Literature review
synthesis

(continued)

Reference	Objective	Focused dimensions
Kampoomprasert (2019)	adaptability and coordination as characteristics of a sustainability humanitarian logistics	
Dubey and Gunasekaran (2019)	This project aims to provide a concept of a sustainable humanitarian supply chain (SHSC), as well as to propose and empirically test an SHSC architecture	1. Agility, alignment and adaptability; humanitarian supply chain; performance reward
Whitten <i>et al.</i> (2012)	This research aims to create a triple-A supply chain performance model that considers triple-A supply chain status as a forecast of distribution network performance and operational performance as a predictor of organizational success	1. Alignment: exchanging information; clear layout of roles and responsibility; equal sharing of risk, cost and profit. 2. Agility: real-time information; designing production process. 3. Adaptability; logistic infrastructure. 4. Organizational performance
Salas-Lopez <i>et al.</i> (2014)	The report describes the approach used by a large academic tertiary care hospital in building and implementing alignment and integration models with its collaboration-ready physicians and physician groups	1. Alignment: commitment; cultural fit; engagement; relationship; growth. 2. Tertiary care hospital
Ćwiklicki <i>et al.</i> (2020)	The study aims to determine the essential elements that affect the health-care ability to adapt to the effects of industry 4.0.	1. Adaptability: skills, technology; economic resources; leadership; governance; legal regulation. 2. Health care 4.0. 3. Fourth industrial revolution
Kyrö <i>et al.</i> (2019)	Hospital building and management are challenged by the rapid improvement of medical technology and processes. The study aims to present an organized way to expand adaptability in hospital retrofits, with recommendations for the best time and scope for various adaptability tactics	1. Adaptability: generality; flexibility; elasticity. 2. Construction planning
Nyamu <i>et al.</i> (2015)	The study investigated organizational elements that may affect cooperation in developing countries to improve telemedicine adoption using a conceptual research approach	1. Adaptability: collaboration; innovation; organization resources. 2. Telemedicine
Qumer and Henderson-Sellers (2008)	Agile approaches are frequently viewed as ways to avoid the overheads associated with traditional software development settings. Few firms, however, are psychologically or technically capable of quickly and effectively adopting an agile approach. Here, they review a few options for assisting with such a move	1. Agility: flexibility; speed; leanness; learning; responsiveness. 2. Adaptability: collaboration. 3. Industry case studies
Hinkelmann <i>et al.</i> (2016)	In the framework of Enterprise Engineering, the paper discusses Next Generation Enterprise Information Systems. Today's enterprises have a huge challenge faced by companies and IT alignment in a dynamic environment	1. Alignment: enterprise engineering; enterprise architecture
McHugh <i>et al.</i> (2015)	They adopted agile approaches to show that they could construct regulatory-compliant software for a medical equipment software development process. This implementation	1. Agility and adaptability: requirements management; time management; design complexity. 2. Medical

(continued)

Table 1.

Reference	Objective	Focused dimensions
	demonstrated that agile approaches can be deployed successfully and that benefits can be realized	
Kannan <i>et al.</i> (2017)	In work, they explore four practical agile co-development approaches demonstrated to be beneficial in health-care settings	1. Agile and adaptability: innovativeness
Tripp and Armstrong (2018)	This article divides 12 common agile methodologies practices into categories based on whether they are mainly project and software development process focused. It examines how firms' motivations for adopting influence of agile approaches they deploy	1. Agile methodologies. 2. Adoption motivation 3. IT project management
Silva and Goldman (2014)	The article outlines the current inquiry stage on how firms adopt agile methodologies to find a correlation between an organization's qualities and how it efficiently converts to agile	1. Agile methods adoption
Gandomani and Nafchi (2015)	This study found a simple and adaptive agile transition and adoption methodology effective. The research aims to present the framework that has been created	1. Agile adoption 2. Agile software development
Turetken <i>et al.</i> (2017)	The paper created a maturity model to help software development businesses define a roadmap for using the Scaled Agile Framework	1. Agile software development 2. Scaled Agile Framework
Tavis (2017)	The aligned company summed up the idea that actual alignment provided a strategic benefit to an organization. It has a better understanding of what to do at any given time and can rely on others to make the appropriate decisions	1. Agility and alignment: culture
Nuottila <i>et al.</i> (2016)	The study contributes to the knowledge about adopting agile techniques in public organizations, focusing on what public organizations may experience while implementing these methods. In addition, the study aims to identify and characterize the barriers to adopting and using agile approaches in public IT projects using private software vendors	1. Adoption of agile methods 2. Software project management
Feibert and Jacobsen (2019)	This study will combine the innovation framework with a process management approach to refine and expand technology adoption theory for a health-care logistics scenario	1. Technology adoption
Barata <i>et al.</i> (2018)	They build on the "ground-truth" provided by health-care practitioners in the study to indicate risks and potential for HIS advancements while also raising understanding of the risks	1. Alignment: hospital quality; information systems
Kwanroengjai <i>et al.</i> (2014)	This article presents an operational alignment methodology for ensuring that the business and IT components are synchronized	1. Alignment: process alignment; IT alignment; business performance
Nair and Dreyfus (2018)	The study explores the effects of regulation change on technology installation and uses in	

Table 1.

(continued)

Reference	Objective	Focused dimensions
	the health-care sector. For example, the federal government now requires hospitals to demonstrate meaningful use of information technology	1. Adaptability and alignment: strategic IT alignment; IT adoption strategies
Patrucco and Kähkönen (2021)	The paper aims to connect the data to three essential skills for supply chains operating in the post-COVID-19 pandemic business world: agility, adaptability and alignment	1. Agility 2. Adaptability 3. Alignment 4. Supply chain
Garrido-Vega <i>et al.</i> (2021)	The paper examines how the firm's plan and competitive climate impact the adoption of triple-A capabilities	1. Firm performance 2. Triple-A
Huma and Ahmed (2022)	The paper examines the triple-A characteristics and how they simultaneously affect the three triple-A elements	1. Triple-A elements 2. Triple-A characteristics 3. Agility 4. Adaptability 5. Alignment

Table 1.

people who would be good interview subjects and fit the predetermined criteria. The predetermined criteria are the following:

- The interviewee should be from a start-up covering sectors such as IT, manufacturing, engineering and agriculture.
- Up to 10 years after the date of incorporation and registration, an organization shall be regarded as a start-up.
- The interviewee range includes chief executive officers, chief technology officers, analysts, HR managers, operations managers, product managers and public relations associates.

In relation to the snowball sampling, each participant was asked whether they knew anyone who understood the phenomenon of agility, adaptability and alignment in start-ups. As a result, suggestions from interviewees would be used to choose a good candidate to respond to the research questions.

3.1.2 Conducting interviews. The interviews were conducted in different start-ups over a period of two months. Each interview is set for 1 h, with 10 min dedicated to explaining the research and enablers definition, and the remaining 50 min were dedicated to feeding data from these experts in the proper manner. The interview timing would be depending on the interviewee's availability and schedule. The details of the experts are shown in Table 2. Ethical problems such as the use of consent forms, privacy protections, confidentiality and anonymity were all carefully examined. The researcher introduced herself and provided a general overview of the research conducted before beginning the interview. The researcher then inquired about the start-up in general. Then specific questions related to agility, adaptability and alignment were asked by using the closed-ended questionnaire. The questionnaire was measured using a "five-point Likert scale," with "1" being "no influence" and "5" being "very high influence." For example: "Factor 1 influencing F2-F10, if yes, rate the influence from 2–5; if no, rate the influence as 1." If the respondents give any of the questions a score of "3" or "4," indicating "strong influence" or "very high impact," there will be a follow-up question asking them to explain why they gave that score. This follow-up

inquiry aims to determine the significance of that specific impact. Members of this study come from various sectors of start-ups, including “IT,” “manufacturing,” “services,” “agriculture,” “digital marketing” and “construction.”

3.2 Data analysis methods

“Interpretive Structural Modeling (ISM)” is an analytical technique used to identify and summarize the relationship between distinct factors that constitute a challenge or issue (Sage, 1977; Warfield, 1974). ISM converts imprecise and feebly expressed rational models of various systems into relatively simple and unambiguous models (Warfield, 1974). It offers a mechanism for imposing order on the complexities of such factors (Talapatra *et al.*, 2022; Jharkharia and Shankar, 2005). The limitations of ISM are the following:

- “Individuals who are familiar with the ISM methodology and capable of deducing the information can use it.”
- “The perception of links is somewhat feeble, and as a result, the model does not provide the same interpretation for different individuals.”
- “It only aids in answering the questions ‘what’ and ‘how’ in theory construction. However, it is silent on the causality of linkages and thus unable to answer the question ‘why’ in theory building.”
- “It does not take into account transitive linkages in the digraph” (Jena *et al.*, 2017).

Therefore, the enhanced version of ISM is TISM, which explains why each contextual link among factors exists (Yadav, 2014). The relationships between the elements of a digraph are better represented using the TISM approach (Menon and Suresh, 2019). An arrow indicates the direction and hierarchical order of the relationships between the elements. The levels at which the influential barriers are finally put in the digraph can be used to identify them. The connecting arrow describes the contextual links between any two parts (Shibin *et al.*, 2017). The transitive relations may be traced to using critical thinking, another improvement over the conventional ISM. In contrast to ISM, TISM only considers the truly effective transitive relationships while creating the model, checking for other reasons for transitivity with expert opinion (Shibin *et al.*, 2017). MICMAC is also used to categorize the factors. Factors never have equal relationships; some may be strong, while others may be weak. The more solid the bond, the more successful the model will be. Each factor’s degree of dominance and interdependence enables MICMAC analysis to classify barriers and pinpoint the crucial components that power the structural model.

TISM has been used in practically every discipline such as in e-government (Nasim, 2011), private higher technical education (Prasad and Suri, 2011), higher education

Table 2.
Respondent’s profile

Designation	No. of respondents
Analyst	3
Chief executive officer	11
Chief technology officer	1
HR manager	4
Operations manager	4
Product manager	2
Public relation associate	3
Total number of respondents = 28	

(Menon and Suresh, 2019), health care (Vaishnavi *et al.*, 2019a, 2019b) and so on. In this paper, we used the TISM approach to analyze the interrelationships between the competitive advantage factors in start-ups. This suggested methodology covers the phases of “what,” “how” and “why.” To determine the crucial dimensions or factors that address the question “what,” a literature review is conducted first. Over time, the literature in every field investigates and considers several crucial aspects that cover the subject of interest. These characteristics or elements can be found and examined, covering relevant studies published in the literature. Once the factors or components have been found, the literature is then used to determine the interrelation of various pairings of these components using the TISM technique, which answers the question of “how” the fundamental components connect. The model’s structure, which shows the hierarchical links between the components described in the literature, is explained by the answer to the “how” question. The embedded interpretations on both nodes and links of TISM, an improved form of ISM, are well known (Sushil, 2012). To clarify the links between the elements found in the literature, the TISM process is applied. Pair comparisons are performed step-by-step to start the procedure. To answer the question of “why,” the interpretation is made after developing the TISM digraph.

The flow of research methodology steps is shown in Figure 1.

The following steps are adopted (Vaishnavi *et al.*, 2019a, 2019b) for the successful application of the TISM model:

3.2.1 Step I: identification of the factors. The criteria are determined by reviewing the literature and expert views. A thorough literature analysis was conducted in the context of agility, adaptability and alignment, and acceptable compatible elements for agility, adaptability and alignment in start-ups were found. In addition, these start-up professionals are asked for their inputs. The identified major factors are listed in Table 3.

3.2.2 Step II: establish interconnectedness between factors. An initial reachability matrix (IRM) is created by combining the interconnectedness between the enablers. “Factor K influences Factor L,” for example. There are just two potential replies to this question: “yes or no.” If the response is affirmative, the relationship strength must be specified, which might be no influence, low influence, moderate influence, high influence or very high influence. Only very high and high influential relationships are examined in this case, and “1” or a “0” is inserted into the IRM. Managers and top executives from Indian start-ups are sought to perform an expert opinion survey in person; a total of 28 replies are collected in this survey. Table 4 contains the IRM.

3.2.3 Step III: interpretation of a factor’s connection. In the TISM approach, this step answers the question of “how,” and tries to understand how factor *K* influences factor *L*.

3.2.4 Step IV: creating the final reachability matrix after verifying for transitivity. The final reachability matrix (FRM) is created by performing a transitivity check, which involves identifying transitivity owing to inference among a few pairings of the IRM and incorporating it into the model. All “0” entries in the IRM are suitable for transitivity check; if transitivity exists, suitable “1*” or “1**” should be inserted; otherwise, “0” stays in the reachability matrix (Suresh and Arun Ram Nathan, 2020). Table 5 contains the FRM.

3.2.5 Step V: partition of the enablers from final reachability matrix into levels. The partition reachability matrix is derived from FRM (Menon and Suresh, 2020b).

3.2.6 Step VI: designing the interaction matrix. Direct and significant transitive links are used to design the interaction matrix (Vaishnavi and Suresh, 2020). To acquire the digraph, an interaction matrix is created by converting the digraph’s direct and substantial transitive relationships into “1” and “1*/1**,” with no links to “0”. It is depicted in Table 6.

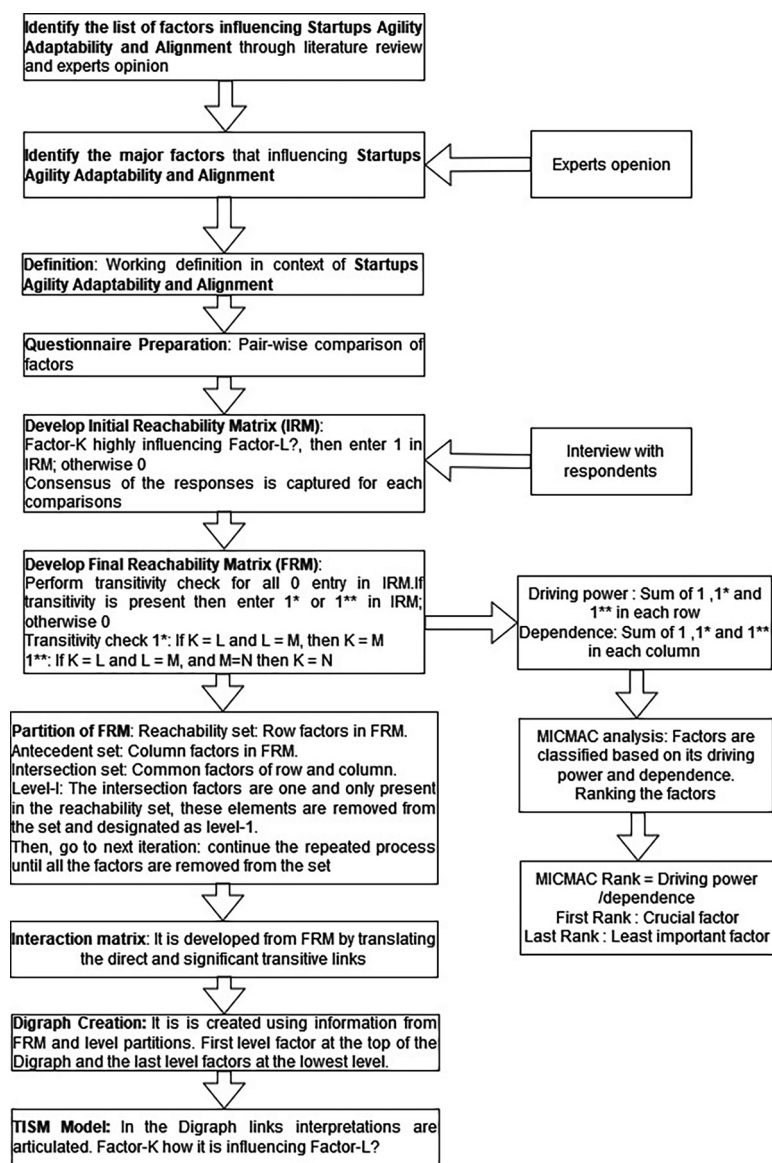


Figure 1.
Flow of TISM
approach for agility,
adaptability and
alignment in start-
ups

3.2.7 Step VII: creating the digraph and the total interpretive structural modelling model. The digraph, also known as the directed graph, is generated by combining data from the interaction matrix and level partitions (Menon and Suresh, 2020a). The elements at the top of the model are referred to as first-level factors in the digraph, and the following levels are listed in ascending order. The TISM model is then created using the digraph and the interpretive interaction matrix. Figure 2 depicts the TISM model, whereas Section 4.1 discusses the rationale for the direct and substantial transitive relationships.

Sl. no.	Factors	Dimensions	References/experts' opinion	Definition
1	Flexibility (F1)	• Agility • Adaptability	Feizabadi et al. (2019)	Flexibility is the ability to adjust to changing situations and think about challenges from different viewpoints. A start-up's antenna will be tuned to signals of change from the outside environment to understand and respond rapidly enough to reinvent its business model. One fundamental antecedent of agility and adaptability has emerged as the flexibility to alter procedures and results. Firms with greater flexibility can better react to changes, alter operating resources, and capitalize on opportunities in turbulent settings (Feizabadi et al., 2019)
2	Information integration (F2)	• Adaptability • Alignment	Feizabadi et al. (2019) , Dubey et al. (2015)	Information integration is the act of merging all the information required for start-ups into a single system that performs as a whole (Dubey et al., 2015 ; Feizabadi et al., 2019)
3	Visibility and versatility (F3)	• Agility • Adaptability	Experts' opinion	Visibility means the ability to detect changes, threats and opportunities in the environment. Versatility is the ability to adapt or be adapted to the changes. To provide good quality products or services, start-ups need to detect the changes happening in the market quickly and adapt to the changes and to the customers' expectations
4	Development and launch of new products/ services (F4)	• Adaptability • Alignment	Feizabadi et al. (2019) , Dubey and Gunasekaran (2019) , Nyamu et al. (2015)	New product/service development means developing innovative products or services with incremental and radical improvements. The entire process of bringing a product to market, from recognizing a marketing opportunity to product launch, is necessary for the start-ups to properly align the process (Feizabadi et al., 2019 ; Dubey and Gunasekaran, 2019 ; Nyamu et al., 2015)
5	Collaboration (F5)	• Adaptability • Alignment	Dubey et al. (2015) , Dubey and Gunasekaran (2019) , Nyamu et al. (2015)	Collaboration means individuals are working together for a common purpose to achieve start-ups benefit (Dubey et al., 2015 ; Dubey and Gunasekaran, 2019 ; Nyamu et al., 2015)
6	Customer value (F6)	• Adaptability • Alignment	Sanders (2008) , Feizabadi et al. (2019)	Customer value means improved ability to meet customer value. Customer value is best defined as a balance between the benefits a customer obtains from a service or product and the effort, or the challenges they confront in using or receiving the product or service in question (Sanders, 2008 ; Feizabadi et al., 2019)

(continued)

Table 3.
Identified factors and references influencing agility, adaptability and alignment in start-ups

Sl. no.	Factors	Dimensions	References/experts' opinion	Definition
7	Conflict management (F7)	Alignment	Experts' opinion	Conflict management means ability to resolve inter-firm disputes. Conflict resolution aims to improve group and learning outcomes, such as organizational effectiveness or performance. Conflict, when handled correctly, has the potential to improve collective results
8	Management involvement (F8)	- Agility - Adaptability - Alignment	Dubey et al. (2018)	Through its leadership and dedication, management promotes employee empowerment and higher levels of work satisfaction (Dubey et al., 2018)
9	Aggregate performance (F9)	Alignment	Gligor et al. (2015) , Handfield et al. (2015)	Better financial and operational results (combined into one construct). Improved financial outcomes such as profitability, cost and revenue are examples of financial performance. Improved operational performance entails higher quality, productivity, innovation and efficiency (Gligor et al., 2015 ; Handfield et al., 2015)
10	Speed of response (F10)	Agility	Charles et al. (2010) , Experts' opinion	Speed of response means the ability to respond to the changes by start-ups quickly. The start-ups needed to improve decision-making speed while also increasing efficiency, using technology and data in novel ways and expanding the scope and scale of innovation (Charles et al., 2010)

Table 3.

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1	1	0	1	1	0	0	0	0	1	1
F2	0	1	1	1	0	0	0	0	1	0
F3	0	0	1	1	0	0	0	0	0	0
F4	0	0	0	1	0	1	0	0	0	0
F5	0	1	0	0	1	1	0	0	0	1
F6	0	0	0	0	0	1	0	0	0	0
F7	1	1	0	0	1	1	1	0	0	0
F8	0	0	1	1	1	1	1	1	1	0
F9	1	0	0	1	0	0	0	0	1	0
F10	0	0	1	1	0	0	0	0	0	1

Table 4.
IRM for factors influencing agility, adaptability and alignment in start-ups

4. Results and discussions

4.1 Interpretation of total interpretive structural modelling di-graph

[Figure 2](#) depicts a graphical depiction of the TISM study of the elements influencing agility, adaptability and alignment in start-ups.

Level IX: This level has one factor: factor 8 (management involvement). Management involvement gives staff members the chance to decide how to carry out their duties and participate in company operations. F8 influences six factors i.e. F3, F4, F5, F6, F7 and F9.

F8 influencing F3: Management involvement influences visibility and versatility. Employee empowerment and increased job satisfaction because of its leadership and dedication enable start-ups to identify market changes rapidly and react to the changes as well as the customers' expectation to supply high-quality products or services.

F8 influencing F4: Management involvement influences the development and launch of new products/services. Employee empowerment and increased job satisfaction are facilitated by leadership and dedication. It gives organizations rewards and tools for participating in entrepreneurially oriented activities and expanding by introducing new products or services or accessing new markets (Naldi and Davidsson, 2014).

F8 influencing F5: Management involvement influences collaboration. It allows each participant to possibly gain more information from the endeavor than would have been achievable with a comparable contribution made individually. Sharing resources across two or more firms is one method of lowering the cost of product innovation and the chance of failure (Lassen and Laugen, 2017).

F8 influencing F6: Management involvement influences customer value. Perceived value and consumers' willingness to pay extra for the items or services they prefer are influenced by continuous staff commitment to service delivery and customer participation. Managers

Table 5.
FRM for Factors
influencing agility,
adaptability and
alignment in start-
ups

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	Driving power
F1	1	0	1	1	0	1*	0	0	1	1	6
F2	1*	1	1	1	0	1*	0	0	1	1**	7
F3	0	0	1	1	0	1*	0	0	0	0	3
F4	0	0	0	1	0	1	0	0	0	0	2
F5	1**	1	1*	1*	1	1	0	0	1*	1	8
F6	0	0	0	0	0	1	0	0	0	0	1
F7	1	1	1*	1*	1	1	1	0	1*	1*	9
F8	1*	1*	1	1	1	1	1	1	1	1*	10
F9	1	0	1*	1	0	1*	0	0	1	1*	6
F10	0	0	1	1	0	1*	0	0	0	1	4
Dependence	6	4	8	9	3	10	2	1	6	7	

Note: *, ** Represents transitive links

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1	1	0	1	1	0	0	0	0	1	1
F2	1*	1	1	1	0	0	0	0	1	0
F3	0	0	1	1	0	1*	0	0	0	0
F4	0	0	0	1	0	1	0	0	0	0
F5	0	1	0	1*	1	1	0	0	0	1
F6	0	0	0	0	0	1	0	0	0	0
F7	1	1	0	0	1	1	1	0	1*	0
F8	0	0	1	1	1	1	1	1	1	0
F9	1	0	1*	1	0	0	0	0	1	1*
F10	0	0	1	1	0	0	0	0	0	1

Note: * Represents significant transitive links

Table 6.
Interaction matrix

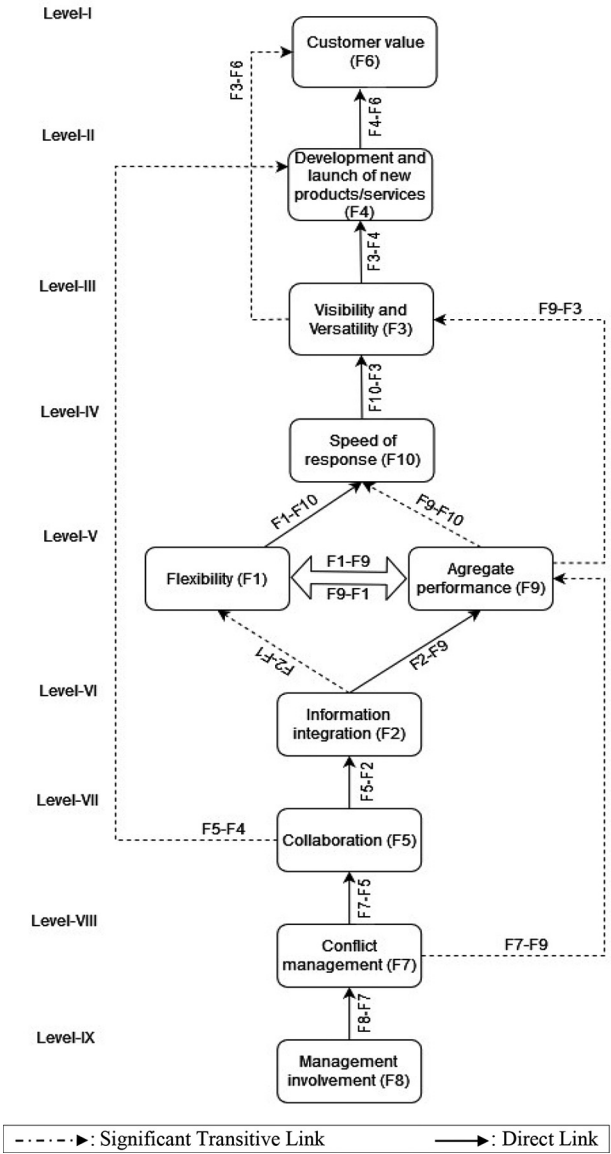


Figure 2.
TISM model for
factors influencing
agility, adaptability
and alignment in
start-ups

must be knowledgeable because different forms of management involvement significantly affect customer value (Izogo *et al.*, 2020).

F8 influencing F7: Management involvement influences conflict management. Well-managed management empowerment and an adequate conflict management approach are critical for start-ups' success. Management involvement leads to constructive conflict management techniques rather than competing tactics or evasion, and collaborative conflict management techniques lead to relationships that fulfill the persons involved.

F8 influencing F9: Management involvement influences aggregate performance. Management involvement helps in improved financial and operational outcomes. Improved financial outcomes such as profitability, cost and revenue are examples of financial performance. Improved operational performance entails higher quality, productivity, innovation and efficiency levels. The proportional influence of a business unit manager on aggregate profitability is significant in start-ups with higher interfirm interdependence. According to [Nair \(2006\)](#), management leadership was shown to be favorably connected to aggregate performance.

Level VIII: This level has one factor: factor 7 (conflict management). Conflict management is known as recognizing and resolving problems rationally, equitably and effectively. F7 influences five factors i.e. F1, F2, F5, F6 and F9.

F7 influencing F1: Conflict management influences flexibility. When conflict management tactics are out of balance, the need of maintaining an acceptable balance of flexibility and stability becomes clear ([Dignath et al., 2015](#)). People may adapt to and avert conflict scenarios concurrently in one activity, implying some flexibility in managing conflict.

F7 influencing F2: Conflict management influences information integration. At a general level, integration is concerned with forming principles that go beyond what is produced if the parties just split the ideals that are clear at the commencement of a conflict resolution process. When such principles can be discovered, a conflict has integrative possibilities.

F7 influencing F5: Conflict management influences collaboration. Conflicts arise regularly in collaboration environments as a result of a lack of shared context, restricted information exchange channels and poor interpersonal relationships among members. Conflict management helps individuals work together in a healthy manner without conflict for the common purpose to achieve start-ups' benefit.

F7 influencing F6: Conflict management influences customer value. Effective dispute resolution raises customer happiness, trust and overall customer value. It has a favorable impact on client loyalty as well. Start-ups may gain from educating their workers in conflict resolution, improving abilities in detecting and resolving possible client issues and implementing a quick and procedurally sound conflict resolution procedure ([Ndubisi et al., 2013](#)).

F7 influencing F9: Conflict management influences aggregate performance. Conflict management tactics aid in the improvement of aggregate performance by enabling a free flow of information between employees and management, as well as promoting interpersonal ties among coworkers to raise morale.

Level VII: This level has one factor: factor 5 (collaboration). Collaboration is a business strategy where people come collectively for a shared goal to advance the start-up. F5 influences four factors i.e. F2, F4, F6 and F10.

F5 influencing F2: Collaboration influences information integration. A healthy collaboration helps the start-ups to easily merge all the information required for start-ups into a single system on time.

F5 influencing F4: Collaboration influences developing and launching new products/services. Companies had easier exposure to innovative research and discoveries, and collaboration also aided in the development of new products and processes ([Lassen and Laugen, 2017](#)). Collaboration is particularly beneficial for creating value through new products or services ([Lee et al., 2012](#)).

F5 influencing F6: Collaboration influences customer value. Some types of collaboration may be associated with an increase in the considered value of one brand as a consequence of providing customers with the option to engage in discussion boards.

F5 influencing F10: Collaboration influences speed of response. A healthy collaboration helps the start-ups to quickly respond to the changes. The start-ups needed to improve decision-making speed while also increasing efficiency, using technology and data in novel ways, and expanding the scope and scale of innovation. This is only possible through collaboration.

Level VI: This level has one factor, which is factor 2 (information integration). The combining of information from diverse sources with various theoretical, situational and typographical forms is known as information integration. F2 influences four factors i.e. F1, F3, F4 and F9.

F2 influencing F1: Information integration influences flexibility. Merging all the information helps start-ups adjust to changing situations and think about challenges from different viewpoints. A start-up's antenna will be tuned to signals of change from the outside environment to understand and respond rapidly enough to reinvent its business model.

F2 influencing F3: Information integration influences visibility and versatility. The process of combining all of the information needed by start-ups into a unified system that functions as a whole aid the start-ups in detecting the changes, risk, and opportunities in the environment. Start-ups must be able to notice market changes rapidly and react to such changes as well as client expectations to produce high-quality products or services.

F2 influencing F4: Information integration influences the development and launch of new products/services. By delivering up-to-date market knowledge, information integration improves organizational flexibility to market needs, boosting organizations' responsiveness to new market requirements and unforeseen changes in environmental demands. It also helps to avoid the risk of developing and launching new products or services because of failing to fulfill market demands (Wong, 2013).

F2 influencing F9: Information integration influences aggregate performance. Combining all of the information necessary for start-ups into a single system that functions as a whole is known as information integration. This contributes to better financial and operational outcomes. Improved financial outcomes such as profitability, cost and revenue are examples of financial performance. Improved operational performance entails higher quality, productivity, innovation and efficiency levels.

Level V: This level has two factors: factor 1 (flexibility) and factor 9 (aggregate performance). Being able to adjust to changing situations at work quickly is what is meant by flexibility. Aggregate performance combines better financial and operational results (combined into one construct). F1 influences four factors i.e. F3, F4, F9 and F10. F9 influences four factors i.e. F1, F3, F4 and F10.

F1 influencing F3: Flexibility influences visibility and versatility. A start-up's antennae will be tuned to external change signals to comprehend and respond quickly enough to rethink its business model. Start-ups benefit from flexibility in detecting changes, dangers and opportunities in the environment. the ability to adjust or be adapted to changes start-ups must be able to notice market changes rapidly and react to such changes as well as client expectations to produce high-quality products or services.

F1 influencing F4: Flexibility influences the development and launch of new products/ services. In today's extremely dynamic international market climate, nothing can be predicted or anticipated at the planning stage. Though new product/service development gives a competitive edge and the chance for large earnings, it is a significant risk activity for the start-ups. Firms should consequently take a dynamic approach to control product development risks by coordinating the activities of multiple areas such as engineering,

manufacturing, marketing, quality and design. Flexibility has been demonstrated to improve both efficacy and efficiency of product or service innovation efforts (Singh, 2004).

F1 influencing F9: Flexibility influences aggregate performance. Flexibility has been conspicuously lacking. Flexibility in start-ups may be a possible source of increasing the start-ups' effectiveness and efficiency and maybe a major indicator of overall performance.

F1 influencing F10: Flexibility influences the speed of response. The capacity to adapt to changing circumstances and consider problems from several perspectives enables start-ups to enhance decision-making speed while simultaneously enhancing efficiency, using technology and data creatively and broadening the scope and scale of innovation.

F9 influencing F1: Aggregate performance influences flexibility. It helps start-ups adjust to changing situations and think about challenges from different viewpoints. It helps the start-ups tune to signals of change from the outside environment to understand and respond rapidly enough to reinvent their business model.

F9 influencing F3: Aggregate performance influences visibility and versatility. It helps the start-ups to detect the changes happening in the market quickly and needs to adapt to the changes and to the customers' expectations to provide good quality products or services.

F9 influencing F4: Aggregate performance influences the development and launch of new products/services. It enables in development of innovative products or services with incremental and radical improvements. The entire process of bringing a product to market, from recognizing a marketing opportunity to product launch, is necessary for the start-ups to properly align the process.

F9 influencing F10: Aggregate performance influences speed of response. It improves decision-making speed while also increasing efficiency, using technology and data in novel ways and expanding the scope and scale of innovation.

Level IV: This level has one factor, factor 10 (speed of response). Speed of response means the ability to respond to the changes by start-ups quickly. F10 influences two factors i.e. F3 and F4.

F10 influencing F3: Speed of response influences visibility and versatility. Start-ups needed to enhance decision-making speed while simultaneously enhancing efficiency, repurposing technology and data and broadening the scope and scale of innovation. Start-ups must be able to notice market changes rapidly and react to such changes as well as client expectations to produce high-quality products or services.

F10 influencing F4: Speed of response influences the development and launch of new products or services. Start-ups needed to accelerate decision-making while also improving efficiency, reusing technology and data and increasing the scope and scale of innovation. This assists start-up in producing unique products or services that improve incrementally and dramatically. For start-ups to correctly align the process, the full process of bringing a product to market, from identifying a marketing opportunity through product launch, is required.

Level III: There is just one component in level three: factor 3 (visibility and versatility). Visibility means the ability to detect changes, threats and opportunities in the environment. Versatility means ability to adapt or be adapted to the changes. Start-ups need to detect the changes happening in the market quickly and adapt to the changes and to the customers' expectation to provide good quality product or services. F3 influences two factors i.e. F4 and F6.

F3 influencing F4: Visibility and versatility influences development and launch of new products or services. One of the most important aspects in terms of gaining and retaining a competitive edge is visibility and versatility. This characteristic primarily entails balancing the operating competence with market requirements, namely, developing and launching new products or services of the appropriate quality and volume (Leończuk *et al.*, 2019).

F3 influencing F6: Visibility and versatility influences customer value. It strikes a balance between the advantages a consumer receives from a service or product and the effort or problems they face when using or getting the product or service in issue.

Level II: Level two contains only one element, which is factor 4 (development and launch of new products or services). New product/service development means developing innovative products or services with incremental and radical improvements. F4 influences one factor, i.e. F6.

F4 influencing F6: Development and launch of new products or services influence customer value. From the standpoint of modern management, enhancing customer value is the key to enduring the corporate world's tough rivalry. As a result, numerous businesses are actively engaged in the development of new products/services. Firms delight consumers and profit by offering value through new products/services. Client pleasure leads to customer loyalty and, in the long run, profitability (Chan and Ip, 2011).

Level I: Level one contains only one element, which is factor 6 (customer value).

Customer value (F6), is related to the objective of this study. Improved capacity to fulfill customer value equates to increased customer value. Customer value is best characterized as a trade-off between a customer's advantages from a service or product and their effort or problems in using or obtaining the product or service in question.

The synthesis of the findings is presented in Table 7.

4.2 Matriced'Impacts Croises-Multiplication Applique' and Classment analysis

MICMAC involves classifying the factors into four zones: driving, autonomous, dependent and linkage (Ramiya and Suresh, 2021). The factors can be explained as below:

4.2.1 *Autonomous factors (Zone I).* Factors with weak dependence and driving power are autonomous enablers (Chillayil *et al.*, 2021). In this study, no factors falling in the autonomous zone.

4.2.2 *Dependent factors (Zone II).* Factors that have higher dependence on other factors but lesser driving power are known as dependence factors (Sreenivasan and Suresh, 2021). In this study, speed of response, visibility and versatility, development and launch of new products/services and customer value are the dependent factors. This factor gets influenced when there is change in the other factors.

4.2.3 *Linkage factors (Zone III).* Factors with a strong dependence and driving power are known as linkage factors (Suresh *et al.*, 2019a). They establish the connection between the dependence and the driving factors. In this study, flexibility and aggregate performance are the linkage factors.

4.2.4 *Driving or independent factors (Zone IV).* Factors that have a strong driving power, but weak dependence, are known as driving factors or independent factors (Suresh *et al.*, 2019b). In this study, management involvement, conflict management, collaboration and information integration are the driving or key factors.

As per the MICMAC analysis, the factors influencing the agility, adaptability and alignment in start-ups are ranked (Lakshmi Priyadarsini and Suresh, 2020) in Table 8.

Figure 3 represents the MICMAC graph. It represents the driving power-dependence diagram based on the MICMAC analysis shown in Table 5.

Table 5 shows the ranking of the factors influencing agility, adaptability and alignment in start-ups based on its driving power and dependence. According to the

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1			Start-ups benefit from flexibility in detecting changes, dangers and opportunities in the environment. The ability to adjust or be adapted to changes start-ups must be able to notice market changes rapidly and react to such changes as well as client expectations to produce high-quality products or services	Though new product/service development gives a competitive edge and the chance for large earnings, it is a significant risk activity for the start-ups. Firms should consequently take a dynamic approach to controlling product development risks by coordinating the activities of multiple areas such as engineering, manufacturing, marketing, quality and design. Flexibility has been demonstrated to improve both efficacy and efficiency of product or service innovation efforts					Flexibility has been conspicuously lacking. Flexibility in start-ups may be a possible source of increasing the start-ups' effectiveness and efficiency and may be a major indicator of overall performance	The capacity to adapt to changing circumstances and consider problems from several perspectives enables start-ups to enhance decision-making speed while simultaneously enhancing efficiency using technology and data in creative ways and broadening the scope and scale of innovation
F2	Merging all the information helps the start-ups to adjust to changing		The process of combining all of the information needed by start-ups into a unified	By delivering up-to-date market knowledge, information integration					The act of combining all of the information necessary for start-ups into a	

(continued)

Table 7.
Synthesis of findings

Start-ups

Table 7.

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F3	situations and think about challenges from different viewpoints. A start-up's antenna will be tuned to signals of change from the outside environment to understand and respond rapidly enough to reinvent its business model		system that functions as a whole aid the start-ups in detecting the changes, risks and opportunities in the environment. Start-ups must be able to notice market changes rapidly and react to such changes as well as client expectations to produce high-quality products or services	improves organizational flexibility to market needs, boosting organizations' responsiveness to new market requirements and unforeseen changes in environmental demands. It also helps to avoid the risk of development and launch of new products or services as a result of failing to fulfil market demands						single system that functions as a whole is known as information integration. This contributes to better financial and operational outcomes. Improved financial outcomes such as profitability, cost, and revenue are examples of financial performance. Improved operational performance entails higher levels of quality, productivity, innovation and efficiency
						It strikes a balance between the advantages a consumer receives from a service or product and the effort or problems they face when using or getting the product or service in issue				

(continued)

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F4				namely, developing and launching new products or services of the appropriate quality and volume						
						From the standpoint of modern management, enhancing customer value is the key to enduring the corporate world's tough rivalry. As a result, numerous businesses are actively engaged in the development of new products/ services. Firms delight consumers and make profits by offering value through new products/services. Client pleasure leads to customer loyalty and, in the long run, profitability				
F5		A healthy collaboration helps the start-ups to easily merge all the		Companies had easier exposure to innovative research and discoveries, and		Some types of collaboration may be associated with an increase in the considered value				A healthy collaboration helps the start-ups to quickly respond to the
										(continued)

Table 7.

Table 7.

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
		information required for start-ups into a single system on time		collaboration also aided in the development of new products and processes. Collaboration is particularly beneficial for creating value through new product or services		of one brand as a consequence of providing customers with the option to engage in discussion boards				changes. The start-ups needed to improve decision-making speed while also increasing efficiency, using technology and data in novel ways, and expanding the scope and scale of innovation. This is only possible through collaboration
F6										
F7	When conflict management tactics are out of balance, the need of maintaining an acceptable balance of flexibility and stability becomes clear. People may adapt to and avert conflict scenarios concurrently in one activity, implying some flexibility in managing conflict	At a general level, integration is concerned with the formation of principles that go beyond what is produced if the parties just split the ideals that are clear at the commencement of a conflict resolution process. When such principles can be discovered, a conflict has integrative possibilities			Conflict management helps individuals work together in a healthy manner without conflict for a common purpose to achieve start-ups' benefit	Effective dispute resolution raises customer happiness, trust and overall customer value. It has a favorable impact on client loyalty as well. Start-ups may gain from educating their workers in conflict resolution, improving abilities in detecting and resolving possible client issues, and implementing a quick and			Conflict management tactics aid in the improvement of aggregate performance by enabling a free flow of information between employees and management, as well as promoting interpersonal ties among coworkers to raise morale	

(continued)

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F8			Employee empowerment and increased job satisfaction as a result of its leadership and dedication enables start-ups to identify market changes rapidly and react to the changes as well as the customers' expectation to supply high-quality products or services	It gives organizations with both rewards and tools for participating in entrepreneurial activities and expanding by introducing new products or services or accessing new markets	It allows each participant to possibly gain more information from the endeavor than would have been achievable with a comparable contribution made individually. Sharing resources across two or more firms is one method of lowering the cost of product innovation and lowering the chance of failure	procedurally sound conflict resolution Perceived value and consumers' willingness to pay extra for the items or services they prefer are influenced by continuous staff commitment to service delivery and customer participation. Managers must be knowledgeable because different forms of management involvement have a significant impact in affecting customer value	Management involvement leads to constructive conflict management techniques rather than competing tactics or evasion, and collaborative conflict management leads to relationships that fulfil the persons involved	Improved financial outcomes such as profitability, cost and revenue are examples of financial performance. Improved operational performance entails higher levels of quality, productivity, innovation and efficiency. The proportional influence of a business unit manager on aggregate profitability is significant in start-ups with higher interfirm interdependence		
F9	It helps the start-ups to adjust to changing situations and think about challenges from different viewpoints. It	It helps the start-ups to detect the changes happening in the market quickly and needs to adapt to the changes and to	It enables in developing innovative product or service incremental and radical improvements. The entire process							It improves decision-making speed while also increasing efficiency, using technology and data in novel ways, and

(continued)

Table 7.

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
	helps the start-ups to tune to signals of change from the outside environment to understand and respond rapidly enough to reinvent its business model	the customers expectation to provide good quality product or services	of bringing a product to market, from recognizing a marketing opportunity to product launch, is necessary for the start-ups to properly align the process							expanding the scope and scale of innovation
F10		Start-ups needed to enhance decision-making speed while simultaneously enhancing efficiency, repurposing technology and data and broadening the scope and scale of innovation. Start-ups must be able to notice market changes rapidly and react to such changes as well as client expectations to produce high-quality products or services		This assists start-ups in producing unique products or services that improve incrementally and dramatically. For start-ups to correctly align the process the full process of bringing a product to market, from identifying a marketing opportunity through product launch, is required						

ranking, management involvement (F8) is ranked 1. Customer value (F6), ranked ninth in the MICMAC analysis ranking. It means that it has higher dependence on other factors.

Start-ups

5. Implications of the study

The need for agility, adaptability and alignment in the start-ups is rising and gaining attention among scholars and practitioners alike. Many research studied on triple-A in the supply chain. This study systematically identified factors for implementing agility, adaptability and alignment in start-ups.

5.1 Theoretical contribution

Whetten (1989) adds three essential issues to the theory-building framework: “what,” “how” and “why,” which TISM addresses (Sushil, 2018). Key factors have been identified as answers to the “what” question. The link between the elements would provide a

Factor	Driving power	Dependence	Driving power/dependence	MICMAC rank
F1	6	6	1.000	5
F2	7	4	1.750	4
F3	3	8	0.375	7
F4	2	9	0.222	8
F5	8	3	2.667	3
F6	1	10	0.100	9
F7	9	2	4.500	2
F8	10	1	10.000	1
F9	6	6	1.000	5
F10	4	7	0.571	6

Table 8.
MICMAC rank for
factors influencing
agility, adaptability
and alignment in
start-ups

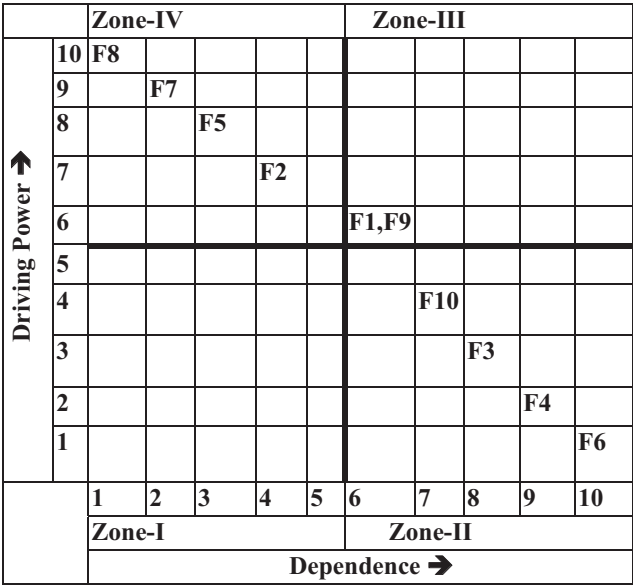


Figure 3.
MICMAC graph

solution to the “how” issue. Understanding the connections would provide us a foundation for answering the question “why?” (Sushil, 2012; Dubey *et al.*, 2017). Based on research of the literature and expert opinion, we propose ten components for agility, adaptability and alignment to answer the question “what.” To address the question “how,” the relationship between the ten agility, adaptability and alignment characteristics is identified. The TISM technique outlines hermeneutic and hierarchical linkages to answer the question “why.” The current study contributes to start-ups’ agility, adaptability and alignment in start-ups.

5.2 Managerial contribution

Start-up executives may use the study’s findings to implement agility, adaptability and alignment competently. Based on the ten agility, adaptability and alignment components in the correct order of priority, managers may estimate the amount of attention necessary for each issue to execute agility, adaptability and alignment in start-ups on a more scientific foundation. The TISM and MICMAC studies aided in identifying the critical pieces that contribute to agility, adaptability and alignment in start-ups, as well as offering insights into how these elements work and what to prioritize for start-up managers and decision-makers. First, importance should be given to management involvement, conflict management, collaboration and information integration. The next importance can be given to flexibility and aggregate performance. The last importance can be given to the speed of response, visibility and versatility, development and launch of new products/services and customer value. A well-managed management empowerment strategy and an appropriate conflict management technique are crucial for the success of start-ups. Management participation leads to constructive conflict resolution approaches rather than competing tactics or avoidance, and collaborative conflict resolution procedures lead to relationships that fulfill the people involved. By delivering up-to-date market knowledge, information integration improves organizational flexibility to market needs, boosting organizations’ responsiveness to new market requirements and unforeseen changes in environmental demands. It also helps to avoid the risk of developing and launching new products or services because of failing to fulfill market demands. This method can be used to determine the aspects that have the greatest impact on agility, adaptability and alignment in start-ups. The preceding flow would assist the management of start-ups in implementing agility, adaptability and alignment in an orderly manner for the continual success of the start-ups.

6. Conclusions

The importance of agility, adaptability and alignment in start-ups is growing and gaining traction among academics and practitioners alike. The speed with which start-ups accepts, reacts to and implements initiatives are just as significant as the actual reaction. As a result, agility, adaptability and alignment are critical for start-ups’ success. To increase agility, adaptability and alignment, start-ups must evaluate and revise their plans. It will act as a catalyst for the development and sustainability of start-ups. Triple-A is the key to reducing the susceptibility in business organizations implementing plans and policies to speed up digitalization and build up the infrastructure necessary to create a positive environment. In light of this, the study suggests that Triple-A is crucial for companies to endure challenges from dynamic external or internal factors, regardless of their size or kind. However, in reality, start-ups serve a greater interest in community welfare and economic development for marginalized and suffering multiple difficulties. Unlike other start-ups that rely on

government funding or philanthropic financing, triple-A companies will lead the competition through unique business measures and methods. Triple-A may alter not simply the job it accomplishes, but also, more crucially, how start-ups operate and think. The capacity to capitalize on possibilities created by crises, such as speeding change, boosting resiliency and finding lessons learned, strongly depends on how well management supports an enterprise-wide attitude centered on agility, adaptability and alignment. Only by doing so before, during and after a crisis – will the start-ups be able to build better and sustain alignment between portfolio and strategy execution. Many studies have been conducted on the triple-A in the supply chain. This study aimed to discover variables for systematically applying agility, adaptability and alignment in start-ups. The current study has identified ten factors for implementing agility, adaptability and alignment in start-ups, using the TISM approach. The factors identified are flexibility, information integration, visibility and versatility, development and launch of new products or services, collaboration, customer value, conflict management, management involvement, aggregate performance and speed of response. The main key factors of management involvement, conflict management, collaboration and information integration would have a greater influence on implementing agility, adaptability and alignment. These factors have a strong driving power, but weak dependence. The findings will assist managers in better comprehending how triple-A capabilities are orchestrated, serving as a platform for choosing where and how to deploy resources to enhance triple-A capabilities. Improved financial and operational outcomes are a result of management participation. Financial performance includes improved financial results, including profitability, cost and revenue. Higher productivity, innovation and efficiency are required for improved operational performance. A business unit manager's proportional impact on overall profitability is significant in start-ups with stronger interfirm interconnection. Customer satisfaction, trust and overall customer value all increase with effective conflict resolution. Additionally, it has a positive effect on customer loyalty. Start-ups may benefit from training their employees in conflict resolution, developing their capacity to identify and address potential customer difficulties, and implementing an efficient and systematic conflict resolution process. Collaboration is especially helpful when developing new goods or services that add value. Healthy teamwork enables start-ups to adapt to changes swiftly. By giving customers a choice to participate in discussion forums, some forms of cooperation may be linked to an increase in the perceived value of one brand. Combining all the information enables start-ups to adapt to shifting circumstances and approach problems from many angles. To comprehend and react swiftly enough to reinvent its business model, a start-antenna up's will be tuned to indications of change from the outside environment.

6.1 Limitations and future research direction

Despite its importance for business progress, the study has significant faults. The current study concentrated on a few start-ups from various industries. In future studies, the research might be expanded to include additional areas with a high number of start-ups. Furthermore, future academics can specialize on any one topic and do study in that field. The TISM approach was used to validate the facilitators of agility, adaptability and alignment on a basic level. Statistical tools such as structural equation modeling might be used to validate it empirically. A qualitative approach to this study might provide more insights and valuable data. Future research on agility, adaptability and alignment may be conducted by taking any sector, i.e. manufacturing, block chain technology, engineering, agriculture, etc.

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About the authors

Aswathy Sreenivasan is a Research Scholar at Amrita School of Business, Amrita Vishwa Vidyapeetham, Coimbatore, India. She holds a master's degree in business administration from Amrita Vishwa Vidyapeetham, India. Her field of study is agility in start-ups' operations and lean in start-ups' operations. Her research interests include sustainability and service operations. She is currently working on lean and agility in start-ups.

M. Suresh is an Associate Professor at Amrita School of Business, Amrita Vishwa Vidyapeetham, Coimbatore, India. He holds a PhD in project management from Indian Institute of Technology, Bombay, India, and master's in industrial engineering from PSG College of Technology, Coimbatore, India. His research interests include issues related to lean and agile operations and performance management. He has authored several papers in Operations Management. He is also a member of International Society on Multiple Criteria Decision Making. M. Suresh is the corresponding author and can be contacted at: m_suresh@cb.amrita.edu