Modelling and analysis for higher education shadow institutions in Indian context: an ISM approach

Arif Jamal Habib Gokak[1,2] · Smita Mehendale[2] · Sanjay M. Bhāle[3]

Abstract

The Indian education sector is booming with increasing number of students enrolling for various educational courses for acquiring higher education. The competition for lucrative jobs adds to the pressure on students to perform in competitive exams for higher education and other skill development courses.Query As a result, students turn to Private Coaching Classes also called Shadow Education and Private Supplementary Tutoring for additional help. Equally competitive environment exists for shadow or coaching institutes. They too face demanding customers which exerts a lot of pressure on them to achieve academic excellence. In this study, quality management perspective was applied to institutional practices along with Interpretive Structural Model methodology and MICMAC technique for developing a framework to enhance students' learning and academic performance in shadow institutes for higher education. Attempt has been made to construct a hierarchical structural model for decision making which takes into account all strategic issues and their interrelationships encountered by shadow institutions. This model or structure if implemented can also help shadow institutes to achieve sustained growth in a highly competitive and dynamic environment.

Keywords Quality management · Interpretive structural modelling · MICMAC analysis · Higher education · Shadow education · Private coaching classes · Private supplementary tutoring

✉ Smita Mehendale
  smita.m@sims.edu

  Arif Jamal Habib Gokak
  hgarifjamal@gmail.com

  Sanjay M. Bhāle
  sanjaybhale@gmail.com

1 Gokak Institute of Career Development, Pune, India

2 Symbiosis Institute of Management Studies, Symbiosis International (Deemed University), Pune, Maharashtra, India

3 Indira Institute of Management, Savitribai Phule Pune University (SPPU), Pune, Maharashtra, India

🖄 Springer

1 Introduction

Higher education includes all educational activities in institutions catering to post-secondary education, which may be full-time, part-time or distant learning courses offered by public or private educational institutions (Fig. 1). A variety of institutional settings like universities, colleges and coaching classes are included in higher education. University and college education is referred to as formal higher education, whereas education provided by "private tutoring and cram and prep schools, is also known as "shadow education (Entrich and Bae 2021, p. 112). Stevenson and Baker (1992) used "Shadow Education" to mean supplementary education or coaching institutes for the first time in their research. The term is now very commonly used in academic literature (Aslam and Atherton 2012; Malik 2017). Bray (2017) formalized the definition of shadow education as private, supplementary and academic education. It also refers to private, paid, non-obligatory classroom teaching after formal school hours (Aurini et al. 2013; Buchmann et al. 2010; Entrich and Byun 2021; Knouse and Fontenot 2008; Waibel et al. 2017), intending to enhance the student's performance in formal school (Stevenson and Baker 1992) and subsequent labor market outcomes (Knouse and Fontenot 2008). Public academic support programs after school hours and free for socially and economically disadvantaged students are undertaken at higher education level in countries like India (Sabharwal 2021), but these have social rather than commercial goals. Hence, shadow or coaching institution (hereafter used interchangeably) is a constituent of an educational system and falls under the private sector (Fig. 1), paid, voluntary, non-formal type of education.

The shadow or coaching class segment itself is divided into three sub-segments as shown in Fig. 2, namely, purely academic classes at school and college level, preparation for professional courses like Charted Account (CA) and Company Secretary (CS) etc. and for competitive entrance exams like medical, engineering etc. (Care Ratings 2018). There are a number of formats in shadow education like one-on-one coaching, small group
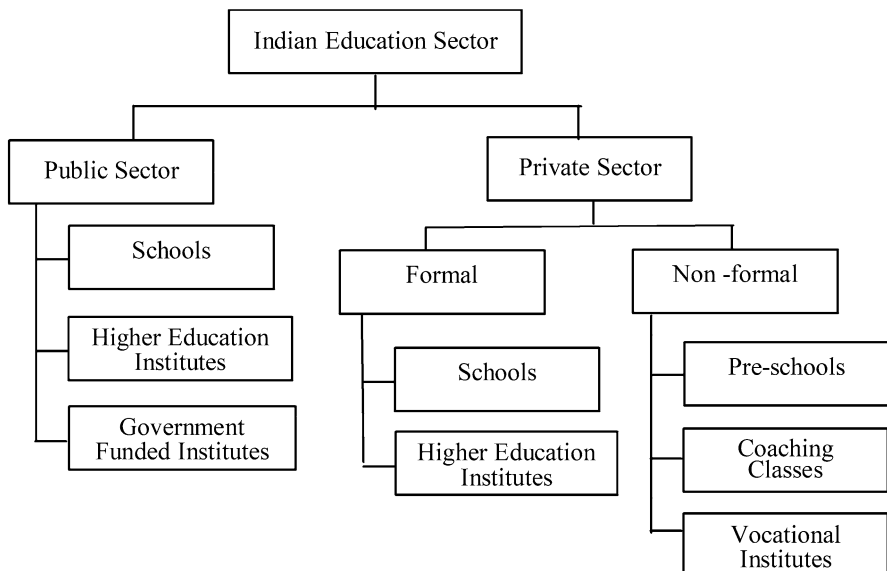

Fig. 1 Segmentation of Indian Education Sector *Source* Care Ratings 2018

Coaching Classes

School & College
Education

Professional Education
CA, CS etc.
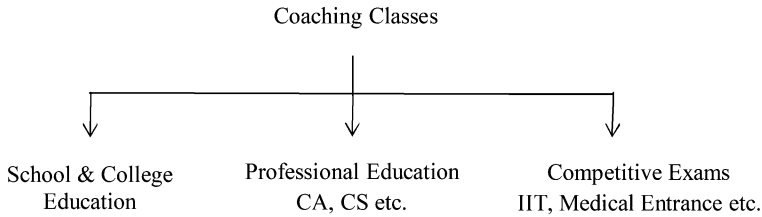
Competitive Exams
IIT, Medical Entrance etc.

Fig. 2 Segmentation of Private Coaching in India *Source* Care Ratings 2018

coaching with usually 5–7 number of students, large groups almost equal to the class sizes of formal education institutions and now the latest entrant, digital coaching using multimedia (Kim et al. 2018; Yung 2015).

The providers of coaching services may include full-time or part-time teachers from the formal educational sector parallelly associated with tutoring after regular work hours. Additionally, it may consist of those who have left the formal education structure to pursue tutoring, professionally qualified individuals, particularly women who may have undergone a career break, or experts from industry and even bright college students. In coaching institutes for higher education, the institute's owner is more often than not the lead faculty. The owner may have started the coaching centre for a particular academic discipline, which may have grown to include other disciplines.

Eventually, such institutes open branches across a city or multiple cities and over time acquire good reputations leading to applications for admissions from across the country. For e.g., Zavare's Professional Academy in Pune city in India has earned a good reputation amongst candidates across the country aspiring to clear the exam of the Institute of Charted Accounts of India due to their high success rate and professional management (Phadke 2018). In India, coaching institutes for specific disciplines in higher education are often localized. Sometimes a city acquires prominence as a centre due to the presence of multiple coaching institutes of repute for a particular professional entrance exam or qualification. For example, Kota in Rajasthan is known to have good coaching institutes for the Indian Institutes of Technology—Joint Entrance Exam (IIT JEE) for admission to the top engineering institutions in India (G., 2022). These institutes now face competition from purely online coaching edtech companies like Byju's, which operates through online and mobile channels on a freemium model, i.e. elementary content is provided free, but a paid subscription is required to access the rest. In response to competition from edtech companies, traditional coaching classes have also upgraded to online delivery modes.

According to Bray (2011) four key factors have an impact on the need for coaching classes namely, social & cultural, educational, economic and geographic. In India, students are burdened with parental and peer pressure to put in efforts to clear competitive exams for admission in higher education institutions. Untill the early 70's, private coaching was considered a necessity for academically weaker students (Abraham 1997). The outlook towards these institutions has changed drastically since then. These are now a necessity for aspiring academically sound students who wish to leave no stone unturned to make it to the top of academic performance (Giavrimis et al. 2018; Kuan 2011) or develop latest and in demand skills set. Around 87% of students in primary school and 95% of students in high school in Tier I cities in India receive private coaching (Mukherji 2013). Shadow education aims to improve performance and focuses on achieving better results typically for academic subjects, competitive exams or skill development often using exam preparatory cram

school approach. However, according to Byun (2014) "Empirical evidence has been inconsistent, contradictory, and even confusing" regarding academic improvement of students who have taken coaching classes. One reason for the inconsistency in outcomes could be due to imprecise definition of shadow education by different researchers. Some researchers considered only academic tutoring for fees as shadow education (Lee et al. 2009; Silova 2009) whereas others included non-academic tutoring as well (Kuan 2011; Dang 2007). Liu (2012) in his research excluded individual and small-group tutoring. Another reason for this inconsistency is lack of panel design that can provide better evidence for the outcomes of shadow education. However, a few studies with well-defined items and sufficient data basis show positive effects in different settings (USA: Buchmann et al. 2010, South Korea: Byun 2014, Japan: Entrich 2018). Others do not, though (Germany: Guill et al. 2020, Switzerland: Hof 2014), which indicates general differences in the functions of shadow education either for remediation or enhancement (Entrich and Lauterbach 2019).

According to Indian Brand Equity Foundation (2020), the Indian higher education segment is estimated to touch US\$ 35.03 billion by 2025. In 2013, the Indian coaching segment was worth \$23.70 billion predicted to swell to 40 billion by 2015 (ASSOCHAM 2013). India has the largest network of higher education institutions and greatest number of school going children in the world. But getting entry into the topmost higher educational institutions is difficult (Bray and Lykins 2012). The formal education sector in India has its own flaws like lack of infrastructure, rigidity of curriculum and work overload of full-time teachers with non-academic work (Bhatt 2016; Sen 2014). Hence, it is unable to meet by itself, the growing aspirations of students (Bray and Kwo 2013). Shadow education institutes play a critical role in supplementing higher education to fulfill aspirations of students. In an ethnographic study conducted by Sen (2014) in India indicated role reversals between formal education and coaching institutes stating that students "follow the private tutors not the teachers".

There is lack of standards or legislation to govern coaching institutes in India (Rajgopal 2014; Nair 2014). Apart from functioning independently, they also form partnerships with schools and colleges and conduct classes within school premises generating additional revenues for themselves and schools, the additional cost of which is borne by the students.

Coaching classes are growing in terms of geographical reach and socio-economic class penetration and are expected to touch many more lives in the near future. Furthermore, there is very little research done on coaching classes in the Indian context. Success stories of coaching classes are well documented (Phadke 2018; G., 2022) but there are failures as well, for which no records are available.

The focus of this research is from the perspective of coaching centers, specifically on how they can create and deliver better value to their customers. Several related factors lead to the success of coaching institutions (Bhatt 2016). Given the excessive competition, these coaching institutes have to look at more professional ways to synergize inputs, practices and outputs to produce enhanced results.

Since coaching institutes fall under the unorganized education sector, the system does not have a proper structure which can be clearly defined and presented. Due to this it becomes difficult to develop a model that identifies the design characteristics which impact the institutional practices, integrate interests of various stakeholders and achieve customer satisfaction. The objective of this study is to develop a holistic and implementable model in the existing system. Therefore, it is useful to employ a methodology like Interpretive Structural Modeling (ISM), which will help in identifying enablers and their interrelationships for coaching institutes that supplement or support higher education institutions, so

that they may create and deliver better value for customers in terms of improved academic performance through quality improvements.

The ISM technique involves an extensive review of literature followed by dialogue with experts in the relevant area of research. In this study, academicians, industry experts in quality management and owners of coaching institutes for higher education have been included. The enablers for enhancing academic performance for coaching institutions for higher education were identified through literature review. A hierarchical relationship between these enablers, their interrelationships and strength of these relationships were established through discussions amongst the panel of experts. The MICMAC analysis helped establish the direct and indirect impact of these enablers on each other.

2 Theoretical framework

Education provided in a coaching institute for higher education should satisfy the needs of both internal as well as external stakeholders. This requires a holistic and structured approach to manage quality by identifying critical aspects of the institution and continuously improving them to enhance business outcomes. Due to the unorganized nature of this business and lack of research in this area of shadow education, literature from higher education and quality management in higher education is considered most relevant. "Quality is generally perceived as a representation of complex mix-and-match of qualities and variables embodied in products and services" (Matorera 2018, p. 22).

Quality Management in the field of professional education sector is extensively researched and documented (Cardoso et al. 2016; Land & Rattray 2014; Liukineviciene and Bilbokaite 2011; Motwani and Kumar 1997). Higher education research in the area of quality management has predominantly focused on practices in educational institutes and input and output processes. Quality in education sector is defined as multi-faceted and includes students, infrastructure, faculty and support staff as input. The interactions of these inputs help in delivering the teaching and learning activities. The effectiveness of the delivery of the teaching and learning activities leads to the quality of output measured through predetermined objectives (Sohani and Sohani 2012).

Quality is defined by authors in different ways. It can mean exception, perfection, transformation, value for money, fit for purpose etc. It is also sometimes viewed as processes and outcomes (Harvey and Green 1993). Sahney et al. (2006) comprehensively defined quality in the field of education as "inputs in the form of students, faculty, support staff and infrastructure; the quality of processes in the form of the learning and teaching activity; and the quality of outputs in the form of the enlightened students that move out of the system". However, the definition of quality which is widely accepted is the degree of customer's and stakeholder's expectations and needs which can be consistently satisfied (Sohani and Sohani 2012). Yet, integrating interests of all stakeholders and customers to formulate a one-line comprehensive definition of quality in educational systems is very challenging.

3 Literature review

Stevenson & Baker (1992) used "Shadow Education" to mean supplementary education or coaching institutes for the first time in their research; the concept is now very commonly used in academic literature. They defined "Shadow education as a set of educational

activities that occur out-side formal schooling and are designed to enhance the student's formal school career". They further wrote that, shadow education includes diverse activities like parents paying tuition fees to private institutes for preparation of examinations, the purchase of workbooks and past question papers, and the conduct of mock tests which are managed by private players. According to Entrich and Bae (2021, p. 112), "there exist a range of supplementary educational practices at the higher education levels in all countries. These practices include quite prominent examples of supplementary, extra- and co-curricular education that are meant to improve the student's academic progress and subsequent labor market outcomes".

The key objective of conducting a literature review was to examine the extant literature and identify critical factors, which influence student learning and academic performance in a coaching institute. The review of literature initially focused on research on private coaching conducted by various scholars. Concurrently, papers using the ISM technique in other sectors and on quality management in services were also included in this review. Significant research work has been carried out separately on private coaching classes and on ISM development and its implementation in the education sector. However, development and implementation of ISM in the segment of shadow education has not been done to the best knowledge of the authors. Also, limited literature is available on higher education segment of shadow education (Entrich and Bae 2021).

3.1 Identification of variables

Quality management is an important means for improvement of processes leading to customer.

satisfaction. It has evolved over time, adding elements relevant to the context of practice as it expanded to different sectors. Hence, a consensus on the critical success factors of quality management does not exist (Asif et al. 2013). Studies on higher education (Asif et al. 2013; Bayraktar et al. 2008) and shadow education highlight common elements like curriculum design, student guidance and support and customer satisfaction (Entrich 2018, 2020; Entrich and Lauterbach 2019, Entrich and Bae 2021).

The review of literature concentrated on identifying variables or practices in a coaching institute that primarily enhance student learning and lead to better business performance of coaching institutes. As a result, 11 variables or enablers (hereafter used interchangeably) were identified which are critical to student learning and to the academic performance and growth of a coaching institute. These enablers are listed below with a brief explanation:

1. Vision and Leadership
2. Strategic Planning
3. Resource planning and management
4. Quality systems and management
5. Curriculum design and development
6. Student support and progression
7. Benchmarking
8. Teamwork
9. Information and Communication Technology
10. Customer focus and Satisfaction
11. Communication

3.1.1 Vision and leadership

Seeley (1992) described vision as a goal-oriented mental concept or construct which guides the behavior of people. A clear vision is like a signpost showing the forthcoming picture of the organization to all stakeholders including customers and also specifies ways to accomplish it (Raj and Attri 2011). Vision must be clearly communicated by the leader to the members of the organization. Vision and leadership although well researched and proven to be important in formal education settings (Sahney et al. 2006; Sohani and Sohani 2012; Majumdar and Tripathy 2018) is also critical for success in informal or shadow education. A visionary leader has the ability to stimulate the requisite support to achieve objectives (Talib et al. 2011; Khanam & Talib 2015). For coaching institutes, clear vision and ability to lead is a starting point for any new instructional practice to be implemented or any improvement to be brought in existing practices.

3.1.2 Strategic planning

Strategic planning involves the creation and development of, and participation in carrying out action plans to enhance achievement of goals (Ketokivi and Castañer 2004). Educational institutions need to recognize that strategic planning and its implementation are imperative if they want to attain excellence and grow in a highly competitive market (Sahney et al. 2006). Strategic planning involves the deployment of short-term as well as long-term plans which are in congruence with the organization's mission and vision (Tarí 2005; Sit et al. 2009) and includes new technology adoption, teamwork participation and sustainable practices. Brah et al. (2002) emphasized the importance of efficient strategic planning deployment through continuous focus on customer requirements, suppliers and stakeholder needs. To achieve scale, a coaching institute needs to strategically plan its location, technology integration for teaching, collaborative partnerships and funding.

3.1.3 Resource planning and management

Resources in an educational institution can be classified as physical, material, human resources and financial (Agabi 2010). Physical resources include facilities like classrooms and offices; material resources include instructional materials, methodologies etc.; human resources i.e. management personnel, teaching, administrative and maintenance staff (Fadipe 1990) and their selection, recruitment, compensation, motivation, empowerment, job rotation, security, and employee development (Altamirano-Corro and Peniche-Vera 2014; Majumdar and Tripathy 2018; Stone 2007); finances i.e. the monetary inputs for attainment of educational objectives (Kosemani 1995). Other relevant non-physical resources include time and information (Agabi 2010). Resources need effective resource planning and management i.e. adequate acquisition, rational distribution, utilization and maintenance (Agabi 2010) to become a key influencer of customer satisfaction (Talib et al. 2011). Our expert group also identified resource planning and management as one of the key variable that can affect education quality and lead to the creation of unique value propositions for coaching institutes. Students join coaching classes to learn from experts who otherwise would not be accessible.

3.1.4 Quality systems and management

Organizations that are quality driven, reflect corresponding set of values, beliefs, attitudes and behaviour pattern of employees which collectively form the organization's culture. Relevant literature emphasizes the importance of the quality culture of an institution and considers it a vital practice to enhance customer satisfaction (Bayraktar et al. 2008) Sureshchandar et al. 2001; Curry and Kadasah 2002); Sila and Ebrahimpour 2003; Talib et at. 2011). All the systems and processes within the organization have to geared to ensure quality delivery. Curry and Kadasah (2002) and Sila and Ebrahimpour (2003) had confirmed in their study that international standards like ISO 9000 help to create a base for quality management system implementation in any organization. Although it may primarily only meet formal standards not necessarily leading to better quality education given the complex processes in an educational institution. Some coaching institutes for higher education in India get ISO certified. But, unlike formal education institutions, mandated or voluntary accreditation at periodic intervals that help continually improve quality within the organization are not done. As a consequence, ensuring quality systems that deliver results has to be well thought out in shadow institutions.

3.1.5 Curriculum design and development

Curriculum is the way education ideas are implemented (Prideaux 2003). Meyers and Nulty (2009) proposed 5 principles of curriculum development which included providing "authentic, real life, relevant, interlinked, encouraging higher order cognitive processes leading to desired learning outcomes in a challenging yet motivating environment''. In formal academic institutions, the main product is an updated design programme (Bayraktar et al. 2008; Sahney et al. 2006) that helps learning and goal attainment (Mykhailyshyn et al. 2018; Fathi et al. 2019; Ahire et al. 1996). In fact, in terms of content, the curriculum of coaching institutes surpasses that of formal education institutions in terms of goal attainment (Kim 2016; Kim and Jung 2019; Sen 2014). Institutions should involve all the relevant functions in design reviews and emphasize on fit for purpose at the service design stage itself (Motwani 2001).

3.1.6 Student support and progression

Prebble et al. (2004) classified student support activities into those that support socio/ emotional needs like social networks, health counselling, recreation services etc. and those that support academic needs like pre-enrolment advice, academic counselling, and supplemental instructions. Institutions need to implement an optimum level of student support (Debnath and Shankar 2014) preferably as a one stop integrated support system (Power et al. 2020). Coaching institutes provide support for academic needs. A thoughtful inclusion of social/emotional needs will lead to enhanced learning.

3.1.7 Benchmarking

Benchmarking is a widely used practice in service organizations and is essential for continuous improvement (Ahire et al. 1996). The aim of benchmarking is to determine successful and proven practices in the industry and adopt these practices to gain competitive benefits

(Sila and Ebrahimpour 2003). Process gaps can be identified using information through benchmarking. Research in the education sector has successfully used benchmarking as a technique to compare educational institutions (Lu 2012; Tran et al. 2020).

3.1.8 Teamwork

Nor Anuar (2018) defined teamwork as work completed by several members with each member doing his part and all members subordinating their individual prominence. Teams have the power to increase productivity, effectiveness, efficiency, customer satisfaction, job satisfaction for employees (Elmuti 1997; Kobolt and Žižak 2013). Team formation and full cooperation and inclusion of all members is needed to improve quality and overcome sectionalism (Yang 2006; Ooi et al. 2007; Khanam and Talib 2015). Coaching institutes are usually started by an academician with expertise in a particular field of study. These institutes grow into branches or centers and need to function like professionally managed organizations with a team of people performing varied roles and responsibilities.

3.1.9 Information and communication technology (ICT)

Digital literacy in many countries is being created by incorporating ICT in formal educational institutions (Pathak and Nawal 2018). ICT includes software, hardware, networks, media for storage, information collection, processing, transmission, and presentation namely data, voice, text, images and related services. It has become an essential educational requirement for enhancing teaching and learning (Parray 2019). Educational institutions are investing in ICT tools for enhancing administration, management and teaching methods. The trend is popular in well-established coaching institutes also.

3.1.10 Customer focus and satisfaction

Customer focus and satisfaction is the level of customer needs and expectations that organizations meet consistently (Ooi et al. 2007; Zhang 2000). It is the parameter of success of quality management (Wisner and Corney 2001; Zairi 2000; Entrich 2018) and leads to enhanced performance (Vouzas and Psychogios 2007). Sufficient data on customer needs, complaints, feedback on service quality levels etc. has to be gathered (Phusavat et al. 2009; Zhang 2000; Teh et al. 2009) and results must be shared to enhance quality (Ahire et al. 1996). For a coaching institute it is absolutely imperative to focus on customers and their satisfaction as students can move to other similar classes (Kim and Jung 2019).

3.1.11 Communication

The purpose of effective communication in an organization is to make sure the requirements of customers are precisely addressed and an atmosphere of trust, knowledge sharing and customer focus is created. Communication within organizations is critical as it connects people and permits functioning of organizations (Gray and Laidlaw 2002). According to Barzelay et al., (1994), good communication helps motivate employees, removes misunderstandings and reduces mistakes. From a coaching institute's perspective, effective communication with students and even parents is imperative for learning and customer satisfaction.

4 Research methodology

The study uses the Interpretive Structural Modeling (ISM) methodology to identify factors and their interrelationships that help efficient implementation of the programs of shadow institutes. For 25 years, interpretive structural modeling (ISM) has been used primarily as an operational technique that deals with multiple complex real life problems and their interrelationships and finds a solution for them (Jayant et al. 2015). It is an interactive and qualitative tool that uses expert group views to establish a hierarchical, comprehensive and systematic structure or model from the identified set of variables which could be directly and indirectly related (Warfield 1974; Sage and Smith 1977). It transforms poorly articulated and unclear models into defined and clear models (Mandal and Deshmukh 1994; Sage and Smith 1977; Qureshi et al. (2007). This helps practitioners get a holistic picture of all elements rather than study them in isolation.

ISM model development begins with a screening of literature to identify relevant variables that have influence over the issue faced by an organization. Next, experts are consulted to confirm the variables and identify the relationships between variables. This step is known as contextual variable relationship development. For this study, the contextual relationship was established between the 11 enablers identified through literature review. The purposive selection of a group of 7 experts was done based on the relevance of their experience and commitment to participate in the study. This expert panel included 2 academicians from higher education institutions with teaching experience in service marketing and quality system implementation, 2 industry experts in quality management and 3 owners of higher education private coaching institutes with prior experience in either formal higher education or industry experience in quality management. One disadvantage of this method of sample selection is bias since the researchers decide whom to include as respondents. However, in case of small samples, this method allows inclusion of specific groups in the population that offer more insights from different perspectives. Initial questionnaire was floated to the respondents inviting their views on inclusion of the 11 enablers. All variable received above 7 point on a 10 point scale in terms of relevance for the study. Next, through virtual group discussions a consensus was sort for the interrelationships between enablers, post which the next steps in ISM process shown in Fig. 3 were followed. These relationships were summarized into a matrix structure titled Structural Self-Interaction Matrix (SSIM), which displays a pairwise evaluation of variables. SSIM was worked upon to first transform it into an Initial Reachability Matrix (IRM) and then into a Final Reachability Matrix (FRM). The Initial Reachability Matrix was converted into Final Reachability Matrix by removing transitivity. Finally, the Interpretive Structural Model was derived from FRM by partitioning different levels using iteration. Next, MICMAC analysis is done by developing a graph to understand the direct and indirect relationship between the enablers and to analyze their driving and dependent power (Mangla et al., 2014). MICMAC analysis complements the ISM approach by resolving constraints of ISM method of exploring only "yes" and "no" in relationships between variables under consideration and overlooking the indirect relationships.

5 Data analysis and results

The steps suggested for developing and implementing the ISM technique are exhibited in Fig. 3. The literature review and identification of variables mentioned in the flow diagram have already been presented in Sect. 2.
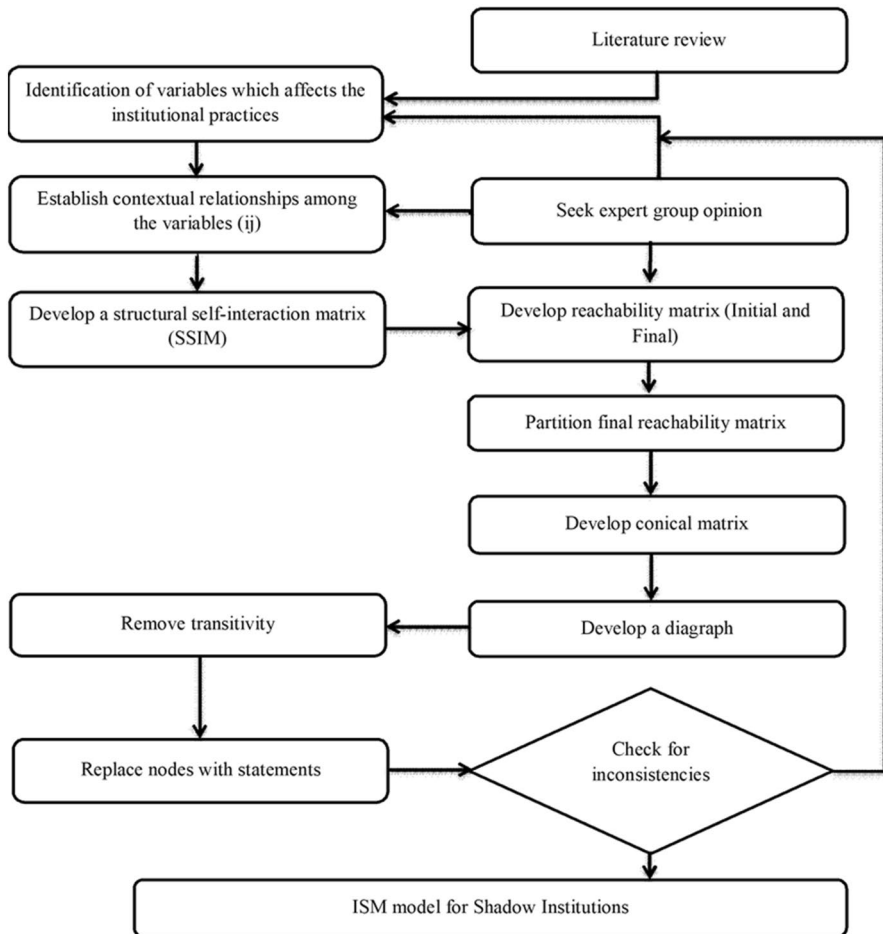
Fig. 3 ISM Flow Diagram

5.1 Developing structural self-interaction matrix (SSIM)

The virtual group discussions among expert panel members lead to consensus on the enablers and the directional relationships existing between pairs of enablers. For example, vision and leadership leads to customer focus and customer satisfaction in a service organization like a coaching institute. Similarly, contextual relationships were established between the other pairs of variables.

Representation of the direction of contextual relationship between two enablers/practice or variables represented by i (rows) and j (columns) was done with four symbols (V, A, X, O) mentioned below.

V: enabler i helps to achieve enabler j
A: enabler j helps to achieve enabler i
X: enabler i and enabler j helps to achieve each other
O: enabler i and enabler j are not related. Both are independent of each other.

SSIM was developed using the above four symbols as mentioned in Table 1.

5.2 Reachability matrix (IRM and FRM)

The reachability matrix is developed from the above SSIM which represents the relationships in binary form. Binary digits 0 and 1 replace symbols V, A, X and O used earlier in accordance with the following rules:

If the i, j entry in SSIM is V, then the i, j entry in the reachability matrix is substituted by 1 and the j, i entry becomes 0.
If the i, j entry in SSIM is A, then the i, j entry in the reachability matrix is substituted by 0 and the j, i entry becomes 1.
If the i, j entry in SSIM is X, then the i, j entry in the reachability matrix is substituted by 1 and the j, i entry also becomes 1.
If the i, j entry in SSIM is O, then the i, j entry in the reachability matrix is substituted by 0 and the j, i entry also becomes 0.

Initial Reachability Matrix (IRM) was developed using the above rules with 11 enablers of quality enhancement of shadow education institutions supporting higher education as shown in Table 2.

Next, Final Reachability Matrix (FRM) is derived from IRM by checking and removing the transitivity between the pairs of variables. The rule of transitivity stipulates; if variable P helps to achieve variable Q and if variable Q helps to achieve another variable R, then the variable P will certainly help to achieve variable R as shown in Fig. 4.

Additionally, the driving power of variables and dependence of variables is computed by adding the total number of 1's in the corresponding row and the total number of 1's in the corresponding columns respectively.

The Final Reachability Matrix (FRM) is presented in Table 3. Transitivity in Table 3 is indicated by 1*. This table also shows the dependence power and driving power for each variable.

Table 1 Structural Self-Interaction Matrix (SSIM)

S.N.	Variables ——— j ——→	11	10	9	8	7	6	5	4	3	2	1
1	Vision and Leadership	V	V	V	V	V	V	V	V	V	V	
2	Strategic planning	A	V	V	A	V	V	O	O	O		
3	Resource planning and management	O	V	V	A	V	V	O	V			
4	Quality systems and management	O	V	O	O	V	O	V				
5	Curriculum design and development	A	V	A	A	V	O					
6	Student support and progression	A	V	A	A	O						
7	Benchmarking	A	V	A	A							
8	Teamwork	A	V	A								
9	ICT	X	V									
10	Customer focus and Satisfaction	A										
11	Communication											

Table 2 Initial Reachability Matrix (IRM)

S.N.	Variables ——— j ——→	1	2	3	4	5	6	7	8	9	10	11
1	Vision and Leadership0	1	1	1	1	1	1	1	1	1	1	1
2	Strategic planning	0	1	0	0	0	1	1	0	1	1	0
3	Resource planning and management	0	0	1	1	0	1	1	0	1	1	0
4	Quality systems and management	0	0	0	1	1	0	1	0	0	1	0
5	Curriculum design and development	0	0	0	0	1	0	1	0	0	1	0
6	Student support and progression	0	0	0	0	0	1	0	0	0	1	0
7	Benchmarking	0	0	0	0	0	0	1	0	0	1	0
8	Teamwork	0	1	1	0	1	1	1	1	0	1	0
9	Information and Communication Technology (ICT)	0	0	0	0	1	1	1	1	1	1	1
10	Customer focus and Satisfaction	0	0	0	0	0	0	0	0	0	1	0
11	Communication	0	1	0	0	1	1	1	1	1	1	1

(i)

5.3 Partitioning the reachability matrix

The Final Reachability Matrix (FRM) is used to determine the hierarchical levels of the identified variables. Warfield (1974) suggested that there are two sets of variable which are obtained from FRM and are called reachability set and antecedent set.

For any particular variable, reachability set comprises of the variable itself and the other variable which it helps to achieve. Likewise, antecedent set comprises of the variable itself and the other variable which helps in achieving it. The intersection between reachability and antecedent set is subsequently determined. Top level priority is assigned to the variables which are the same in reachability and intersection sets and these variables are omitted from the next iteration. This process continues till the final iteration which gives us the lowest level priority. Table 4 below shows iteration 1 where in variable 10 i.e. customer focus and satisfaction has been assigned as level I and hence this variable is placed on the highest hierarchy level in the final ISM structure. Similarly, the other hierarchy levels of each variable are obtained by repeating the iterations. The results of iterations 1 to 6 are shown in the Tables 4, 5, 6, 7, 8 and 9. This partitioning of the reachability matrix assists in construction of digraph and formation of the anticipated ISM structure.
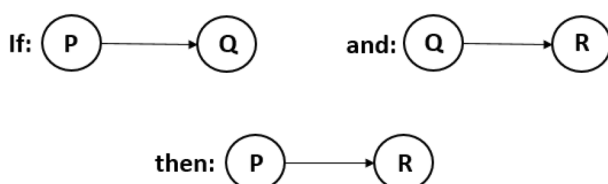
Fig. 4 Transitivity showing relationship between variables

If: (P) ——→ (Q)   and: (Q) ——→ (R)

then: (P) ——→ (R)

Table 3 Final reachability matrix (FRM)

SN	Variables — j →	1	2	3	4	5	6	7	8	9	10	11	Driving power	Rank
1	Vision and Leadership	1	1	1	1	1	1	1	1	1	1	1	11	I
2	Strategic planning	0	1	0	0	1*	1	1	1*	1	1	1*	8	III
3	Resource planning and management	0	1*	1	1	1*	1	1	1*	1	1	1*	10	II
4	Quality systems and management	0	0	0	1	1	0	1	0	0	1	0	4	IV
5	Curriculum design and development	0	0	0	0	1	0	1	0	0	1	0	3	V
6	Student support and progression	0	0	0	0	0	1	0	0	0	1	0	2	VI
7	Benchmarking	0	0	0	0	0	0	1	0	0	1	0	2	VI
8	Teamwork	0	1	1	1*	1	1	1	1	1*	1	1*	10	II
9	Information and Communication Technology (ICT)	0	1*	1*	1*	1	1	1	1	1	1	1	10	II
10	Customer focus and Satisfaction	0	0	0	0	0	0	0	0	0	1	0	1	VII
11	Communication	0	1	1*	1*	1	1	1	1	1	1	1	10	II
	Dependence	1	6	5	6	8	7	9	6	6	11	6		
	Rank	VII	V	VI	V	III	IV	II	V	V	`	V		

5.4 Conical matrix

ISM technique requires clustering of the variables which are at the same levels across each row and each column of the reachability matrix (FRM). This helps in developing a conical matrix which further helps in constructing the digraph and formation of the anticipated ISM structure. Table 10 shows the derived conical matrix.

5.5 Development of digraph

Digraph represents the relationships established between the variables in accordance with their assigned numbers. For example, if there is any relationship that exists between element i and j, it will be shown using an arrow which joins the assigned numbers of element i and j.

Table 4 Iteration 1

Variables	Reachability set	Antecedent set	Intersection	Hierarchy Level
1	1 to 11	1	1	
2	2, 5 to 11	1,2,3,8,9,11	2,8,9,11	
3	2 to 11	1,3,8,9,11	3,8,9,11	
4	4,5,7,10	1,3,4,8,9,11	4	
5	5,7,10	1 to 5, 8,9,11	5	
6	6,10	1,2,3,6,8,9,11	6	
7	7,10	1 to 5,7,8,9,11	7	
8	2 to 11	1,2,3,8,9,11	2,3,8,9,11	
9	2 to 11	1,2,3,8,9,11	2,3,8,9,11	
10	10	1 to 11	10	I
11	2 to 11	1,2,3,8,9,11	2,3,8,9,11	

Table 5 Iteration 2

Variables	Reachability set	Antecedent set	Intersection	Hierarchy Level
1	1 to 9, 11	1	1	
2	2, 5 to 9, 11	1,2,3,8,9,11	2,8,9,11	
3	2 to 9, 11	1,3,8,9,11	3,8,9,11	
4	4,5,7	1,3,4,8,9,11	4	
5	5,7	1 to 5, 8,9,11	5	
6	6	1,2,3,6,8,9,11	6	II
7	7	1 to 5,7,8,9,11	7	II
8	2 to 9, 11	1,2,3,8,9,11	2,3,8,9,11	
9	2 to 9, 11	1,2,3,8,9,11	2,3,8,9,11	
11	2 to 9, 11	1,2,3,8,9,11	2,3,8,9,11	

Table 6 Iteration 3

Variables	Reachability set	Antecedent set	Intersection	Hierarchy Level
1	1 to 5, 8, 9, 11	1	1	
2	2, 5, 8, 9, 11	1,2,3,8,9,11	2,8,9,11	
3	2 to 5, 8, 9. 11	1,3,8,9,11	3,8,9,11	
4	4,5	1,3,4,8,9,11	4	
5	5	1 to 5, 8,9,11	5	III
8	2 to 5, 8, 9, 11	1,2,3,8,9,11	2,3,8,9,11	
9	2 to 5, 8, 9, 11	1,2,3,8,9,11	2,3,8,9,11	
11	2 to 5, 8, 9, 11	1,2,3,8,9,11	2,3,8,9,11	

Table 7 Iteration 4

Variables	Reachability set	Antecedent set	Intersection	Hierarchy Level
1	1 to 4, 8, 9, 11	1	1	
2	2, 8, 9, 11	1,2,3,8,9,11	2,8,9,11	IV
3	2 to 4, 8, 9. 11	1,3,8,9,11	3,8,9,11	
4	4	1,3,4,8,9,11	4	IV
8	2 to 4, 8, 9, 11	1,2,3,8,9,11	2,3,8,9,11	
9	2 to 4, 8, 9, 11	1,2,3,8,9,11	2,3,8,9,11	
11	2 to 4, 8, 9, 11	1,2,3,8,9,11	2,3,8,9,11	

Table 8 Iteration 5

Variables	Reachability set	Antecedent set	Intersection	Hierarchy Level
1	1, 3	1	1	
3	3	1,3	3	V
8	3	1,3	3	V
9	3	1,3	3	V
11	3	1,3	3	V

Table 9 Iteration 6

Variables	Reachability set	Antecedent set	Intersection	Hierarchy Level
1	1	1	1	VI

Table 10 Conical form of Reachability Matrix

Variables	10	6	7	5	2	4	8	9	11	3	1	Driving Power
10	1	0	0	0	0	0	0	0	0	0	0	1
6	1	1	0	0	0	0	0	0	0	0	0	2
7	1	0	1	0	0	0	0	0	0	0	0	2
5	1	0	1	1	0	0	0	0	0	0	0	3
2	1	1	1	1	1	0	1	1	1	0	0	8
4	1	0	1	1	0	1	0	0	0	0	0	4
8	1	1	1	1	1	1	1	1	1	1	0	10
9	1	1	1	1	1	1	1	1	1	1	0	10
11	1	1	1	1	1	1	1	1	1	1	0	10
3	1	1	1	1	1	1	1	1	1	1	0	10
1	1	1	1	1	1	1	1	1	1	1	1	11
Dependence Power	11	7	9	8	6	6	6	6	6	5	1	

The transitivity links were removed in the reachability matrix (FRM) and using this matrix, a final diagram was obtained as shown in the Fig. 5.

5.6 Formation of final ISM model

The conical matrix (Table 10) and digraph (Fig. 5) was used to develop the final structural model using ISM methodology. This model is shown in Fig. 6.

This model enables ordering of the identified set of variables at different levels and hence provides a unique structure to the higher education shadow institutes to improve their institutional practices and enhance students learning.

The model developed, places customer focus and satisfaction at strategic level which clearly sets the business model rolling. Any business strives to achieve customer satisfaction as its top priority and shadow institutions are not immune to this. Its criticality is obvious for shadow institutions as dissatisfied students can move to other similar classes (Kim and Jung 2019).

The other intermediate factors are linked with each other at different levels and support sustainable development of the organization through quality improvements. Ensuring adequacy and competency of resources helps the organization in development and establishment of strategic plans, quality systems, information systems, team formations and effective communication practices. These factors support the design and development of an appropriate and updated curriculum which if implemented, leads to enhanced learning and student's.

satisfaction. This is in line with the findings of Yusuf et al. (2007). Likewise, student support and progression and benchmarking can be used as tools for continual improvement
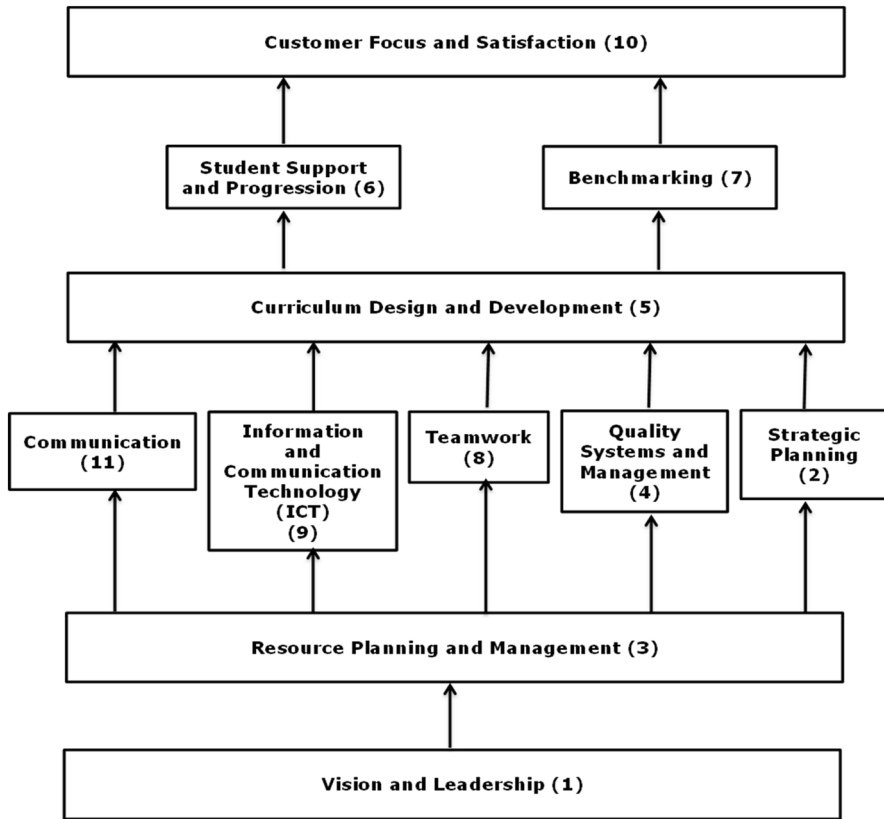
Fig. 5 Diagraph
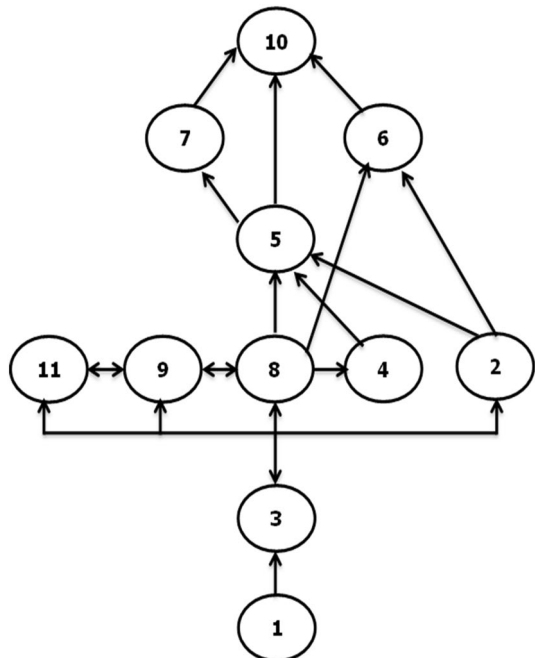
Fig. 6 Final Interpretive Structural Model (ISM) developed for Shadow Institutions

to fulfill academic and selective social/emotional needs of the students for enhanced learning. Customer focus and satisfaction at the top-level shows that it is the most important enabler for shadow institutions. A satisfied customer creates positive word of mouth for the institution by recommending the shadow institution to friends resulting in revenue growth.

Finally, vision and leadership has emerged at the base of the structural model. This clearly shows that this variable plays a substantial role in the success of organizations not only in formal education as confirmed by previous researchers (Sohani and Sohani 2012), but also in informal or shadow education. This factor drives all the other factors and acts as a starting point for implementation of any institutional practice and subsequent continual improvement initiatives. The established relationships between these variables are clearly shown in Fig. 6.

6 MICMAC analysis

MICMAC method of analysis was introduced by Duperrin and Godet (1973). Ravi et al. (2005) stated, "MICMAC analysis can be defined as a secondary classification technique that uses each variable's driving power and dependence in critically investigating the scope

of each variable". Table 10 shows the driving power and dependence of the enablers and the four clusters of MICMAC analysis, namely independent variables, linkage variables, autonomous variables and dependent variables are plotted in Fig. 7.

The technique has been used in this study to identify, analyze and classify the institutional practices in a coaching institution to confirm the significance of some variables and expose other variables which due to their indirect role, play a part but are not detectible in the direct classification.

MICMAC analysis shows the driving power and dependence power of the identified enablers. This analysis clearly depicts the significance and inter-relationships between these practices. The implications of this analysis are as follows:

a. There are no enablers in the autonomous cluster. Hence, it is concluded that none of the enablers have both, weak driving power and weak dependence power. All enablers influence the business processes and hence impact the performance of the institute.

b. Five enablers or practices fall under the dependent cluster. These variables are:

- Quality systems and management (4)
- Curriculum design and development (5)
- Student support and progression (6)
- Benchmarking (7)
- Customer focus and satisfaction (10)

This indicates that these five enablers or practices have weak driving power but they have strong dependencies on other enablers, especially enabler number 10, customer focus and satisfaction. Quality systems and management is important to the quality culture of an institution and needs to be considered as a vital practice to enhance customer satisfaction. All the systems and processes within the organization must be geared to ensure quality product and service delivery. Given the dynamic business environment, curriculum design and development must be continuously evaluated. Gonzalez et al. (2011), differentiated between schools of thoughts for curriculum development while demonstrating quality
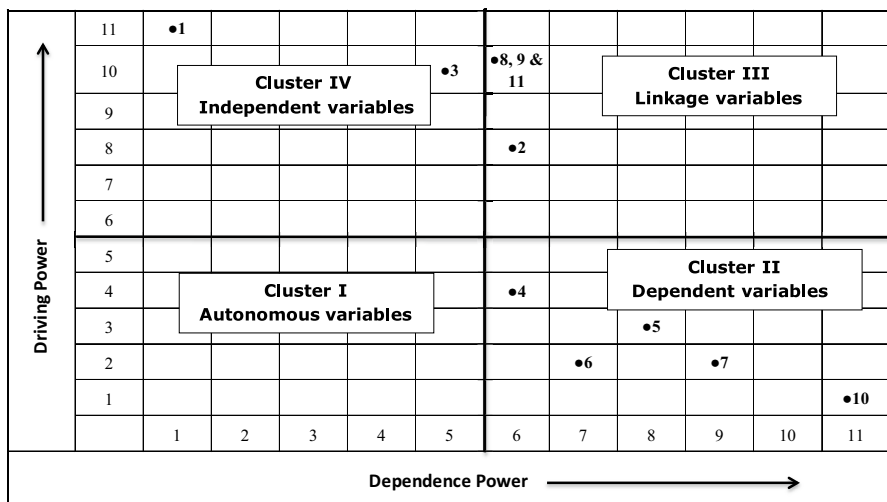

Fig. 7 MICMAC Analysis

management approach along with benchmarking as a suitable approach in formal education. However, since coaching institutes are more inclined towards giving additional academic support to students to excel either in formal education or clear competitive exams for higher education, curriculum design tends to follow the prescribed syllabus and pedagogy for formal education with more rigour. For a coaching institute the most important stakeholders are its students unlike formal higher education institutions that have to consider expectations of industries where they hope to place their students. Making students industry ready is not the goal of coaching institutes but ensuring students expectations are met is a priority. None the less, curriculum development is an essential process for the success of a coaching institute as well. Benchmarking helps in determining successful and proven practices in an industry and their adoption helps organizations to be competitive. Moreover, process gaps can be identified using information through benchmarking. According to Ahire et al. (1996), benchmarking is essential for continuous improvement.

Students are generally satisfied if they get support from the institute which includes moral support, feedback on curriculum, exam time tables, daily lecture schedules, notes, presentations, library facilities, value addition seminars or workshops, forums, placement assistance, competitive exam guidance, student grievances etc. The above five enablers play a major role in improving business performance of an institute and helps to achieve customer satisfaction (Mykhailyshyn et al. 2018; Talib et al. 2011; Yusuf et al. 2007; Singh et al. 2007). Hence, customer focus and satisfaction is on top of the ISM hierarchy. These five variables will be influenced by the variables in the independent and linkage clusters.

c. Four enablers fall under the linkage cluster. These are:
● Strategic planning (2)
● Teamwork (8)
● Information and communication technology (9)
● Communication (11)

This implies that these four enablers are high on driving and dependency power and can influence and drive the enablers placed in the dependent cluster. On the other hand, enablers in the linkage cluster strongly depend on the independent cluster's two lower level enablers i.e. vision and leadership (1) and resource planning and management (3).

Strategic planning provides the action plans on how to achieve the organizational goals and their successful implementation is imperative to achieve excellence and growth in highly competitive markets (Tarí 2005; Sit et al. 2009). Elmuti (1997) concluded that teams have the power to increase productivity, effectiveness, efficiency, customer satisfaction, job satisfaction for employees and this can eventually lead to competitive advantage and a greater market share. As compared with formal education institutions, the team size in a typical coaching institute are smaller and have their own pros and cons. While a large team has more routine and specialized functions, a smaller team can have overlapping roles as they may have to take up multiple roles. Similarly, close interactions in smaller teams' may lead to strong bonds or personality clashes. The leadership needs to ensure open communication between team members to avoid conflicts. Information and communication technology (ICT) includes software, hardware, networks, media for storage, information collection, processing, transmission, and presentation namely data, voice, text, images, and related services. Investing in these ICT tools enhances teaching and learning and improves administration and management processes. Parray (2019) concluded that nation development lies on the progresses made in the field of ICT and education. Effective

communication with students, parents and employees increases customer satisfaction, removes misunderstandings, and reduces mistakes. According to Barzelay et al. (1994), good communication helps in motivation of other employees, removing misunderstandings and reducing mistakes. Hence, these four variables are important for the success of a higher education shadow institution and are positioned as middle order enabler in the ISM structure.

    d. Finally, two enablers fall under the independent variable cluster. These are:

- Vision and Leadership (1)
- Resource planning and management (3)

This indicates that these two enablers have strong driving power, but weak dependency on other variables, especially variable number 1. In the ISM structure, these two variables are placed at the bottom levels. These two variables especially variable number 1; vision and leadership drive all the other variables which are placed at the higher levels. Vision and leadership provided by the top management lays the foundation for success and growth of any institution or an organization in general (Raj and Attri 2011; Sohani and Sohani 2012) and gives guidance and direction to the staff, students, and administration. However, for coaching institutions, often the vision is either not documented or not communicated effectively hence, may not be implemented and remains a talking instrument. Efficient and successful leaders meet this challenge by continuously collaborating with other stakeholders to develop and implement a clear vision. Likewise, a study conducted by Yang (2006) confirmed that resource planning and management significantly affects customer satisfaction. Resources need managerial expertise in ensuring effectiveness i.e. to keep organizational goals within view and efficiency i.e. to ensure prudence in utilization of limited resources and avoidance of wastage due to teaching work overload leading to reduced quality output or excess non-teaching workload.

7 Conclusion

The article explains enablers of quality management in higher education shadow institutions through an integrated structural model and MICMAC analysis. Several key inferences can be drawn from this research. Eleven key practices and their hierarchy levels along with their interrelationships have been identified which are required for the successful business performance of higher education shadow institutions. The structural model developed in this study will help owners and managers of shadow institution understand the contextual relationships between the eleven key variables and comprehend their impact on student satisfaction. Since students are the beneficiaries of educational institutions, they determine the contributions of educational institutions in shaping their future which in turn is critical for the reputation and business prospects of institutions.

    The proposed model is apt for achieving better outcomes in education as it provides integration from first to the last level of determinants for decision making. It clearly identifies vision and leadership of top-management in shadow institutions as the foremost practice for attaining positive outcomes. Efforts to ensure quality in education often fall short due to inability of the top management to share an inspiring vision or remain committed towards it. Lack of vision or commitment of the top management towards its vision derails institutions from achieving planned outcomes. Top management of shadow education

institutions must invest their time and energy in developing a vision as an inspiring image of the future for all stakeholders. To stay current with the changing times, shadow institutions need to undertake both major or minor improvement initiatives in various aspects of business. As suggested in Demings's cycle (Plan-Do-Study-Act), continuous improvement is an important principle of quality management which leads to customer satisfaction by ensuring appropriate organizational response to changing trends. It is imperative that coaching institutions should plan for adopting new technology and integrate them in their teaching methodology, develop highly effective and efficient teams, communicate effectively and collaborate efficiently with stakeholders. Student support and progression depends on how well an institute is customer focused and how efficiently and effectively they use the benchmarking tools and other quality management systems to develop best practices and continually improve the curriculum design and other business processes. Hence, quality management practices can help shadow education institutions in achieving customer satisfaction and improved business performance. This article fills the existing research gap of identifying critical success elements for shadow education institutions and their interrelationships and presents a holistic integrated model.

8 Future scope of study

ISM technique uses expert group opinions to establish the model and interrelationships amongst variables. However, the statistical validity of ISM structure was not carried out as it was beyond the scope of this study. There is a scope for future research on this topic using techniques like structural equation modeling (SEM) which can empirically test and validate model proposed in this study (Attri et al. 2013).

The implication of the above study was limited to higher education shadow institutions only. However, these can be extended to other shadow or formal educational institutions in other areas like coaching classes for school children. The replication and testing of this model in shadow education institutions at local and international level will provide valuable insights into achieving business outcomes through quality management.

Furthermore, just like in most Asian countries, currently a comprehensive policy framework for shadow education in India does not exist. In fact, the possibility of bringing them into the legal framework is highly debated. Going forward, it would be interesting to factor in the legal aspect in shadow education and its impact on business and various stakeholders.

Given the digital invasion of education, shadow institutions are themselves undergoing transformations and are coping with adapting new technology driven strategies. Coupled with a similar situation of formal education given the current crisis of COVID 19, the education sector itself will need to redefine their business models. Starting with mirroring the offline processes online, to completely new and innovative practices that may be more suitable for online classes and delivery of the entire curriculum virtually, we are at the cusp of an educational revolution. This rapid change in the sector is bound to have an impact on shadow education institutions. Their role in the development of human capital of a nation too will be redefined leading to harmonizing educational and industry requirements. New and innovative educational programmes can be designed and executed by shadow institutions using quality management.

Declarations

Conflict of interest Not Applicable.

Ethical Statements We hereby declare that this manuscript is the result of independent creation of the authors and the reviewers' comments. Except for the quoted contents, this manuscript does not contain any research achievements that have been written by other individuals or groups. We are the only authors of this manuscript. The legal responsibility of this statement shall be borne only by us.

Data Availability Not Applicable.

Code Availability Not Applicable.

Author Contributions The authors confirm contribution to the paper as follows: study conception, design, data collection, analysis and interpretation of results: Arif Jamal Habib Gokak & Ms. Smita Mehendale. Draft manuscript preparation: Ms Smita Mehendale, Arif Jamal Habib Gokak and Dr. Sanjay M. Bhāle. All authors reviewed the results and approved the final version of the manuscript.

References

Abraham, P.: Private coaching classes: A need fulfilled... or created? Issues in Medical Ethics, 5(4), 103–104 (1997)

Agabi, C.O.: Prudential approach to resource management in Nigerian education: a theoretical perspective. Int. J. Scientific Res. Educ. **3**(2), 94–106 (2010)

Ahire, S., Golhar, D., Waller, M.: Development and validation of TQM implementation constructs. Decis. Sci. **27**(1), 23–56 (1996)

Altamirano-Corro, A., Peniche-Vera, R.: Measuring the institutional efficiency using dea and ahp: the case of a Mexican university. J. Appl. Res. Technol. **12**(1), 63–71 (2014). https://doi.org/10.1016/S1665-6423(14)71606-2

Asif, M., Awan, M.U., Khan, M.K., Ahmad, N.: A model for total quality management in higher education. Qual. Quant. **47**(4), 1883–1904 (2013)

Aslam, M., Atherton, P.: The 'shadow'education sector in India and Pakistan: The determinants, benefits and equity effects of private tutoring. Education Support Programme Working Paper Series, **38** (2012)

ASSOCHAM, (2013), 'Private Coaching poaches mainstream education', Retrieved from: https://www.assocham.org/newsdetail.php?id=4050#:~:text=The%20Associated%20chamber%20of%20commerce,last%20five%20years%20in%20India.

Attri, R., Dev, N., Sharma, V.: Interpretive structural modelling (ISM) approach: an overview. Res. J. Manag. Sci. **2**(2), 3–8 (2013)

Aurini, J., Davies, S., Dierkes, J. B. (Eds.). Out of the shadows: The global intensification of supplementary education (International perspectives on education and society, Vol. 22), Emerald Group Publishing Limited, Bingley, pp. 259–263 (2013). https://doi.org/10.1108/S1479-3679(2013)0000022026

Barzelay, M., Cohen, S., & Brand, R.: Total quality management in government: a practical guide for the real world. J. Policy Anal. Manag. (1994) Retrieved from: https://doi.org/10.2307/3325397

Bayraktar, E., Tatoglu, E., & Zaim, S.: An instrument for measuring the critical factors of TQM in Turkish higher education. Total Quality Manag. Bus. Excell. (2008) Retrieved from: https://doi.org/10.1080/14783360802023921

Bhatt, C.: Learning and teaching outside the medical colleges. Indian J. Med. Ethics, 5(3), 82 (2016) Retrieved from: https://ijme.in/articles/learning-and-teaching-outside-the-medical-colleges/

Brah, S.A., Tee, S.S., & Madhu Rao, B.: Relationship between TQM and performance of Singapore companies, quality management view project transition management of NASA view project. Int. J. Qual. Reliab. Manag. (2002) Retrieved from: https://doi.org/10.1108/02656710210421553

Bray, M.: The Challenge of Shadow Education: Private Tutoring and its Implications for Policy Makers in the European Union. European Commission, Brussels (2011)

Bray, M.: The impact of shadow education on student academic achievement: why the research is inconclusive and what can be done about it. Asia Pac. Educ. Rev. **15**(3), 381–389 (2014)

Bray, M.: Schooling and its supplements: changing global patterns and implications for comparative education. Comp. Educ. Rev. **61**(3), 469–491 (2017)

Bray, M., Kwo, O.: Behind the façade of fee-free education: shadow education and its implications for social justice. Oxf. Rev. Educ. **39**(4), 480–497 (2013)

Bray, M., & Lykins, C.: Shadow education: private supplementary tutoring and its implications for policy makers in Asia (No. 9). Asian Development Bank (2012)

Buchmann, C., Condron, D. J., & Roscigno, V.J.: Shadow education, American Style: test preparation, the SAT and college enrollment. Soc. Forces. (2010) https://doi.org/10.1353/sof.2010.0105

Byun, S.Y.: Shadow education and academic success in Republic of Korea. In *Korean education in changing economic and demographic contexts* (pp. 39–58). Springer, Singapore (2014)

Cardoso, S., Rosa, M.J., Stensaker, B.: Why is quality in higher education not achieved?: the view of academics. Assess. Eval. High. Educ. **41**(6), 950–965 (2016)

Care Ratings, Overview of the Indian Education Industry (2018), Retrieved from: http://www.careratings.com/upload/NewsFiles/Studies/Overview%20of%20the%20Indian%20Education%20Industry%20June%202018.pdf

Curry, A., & Kadasah, N.: Focusing on key elements of TQM – evaluation for sustainability TQM Mag. (2002) Retrieved from: https://doi.org/10.1108/09544780210429816

Dang, H.A.: The determinants and impact of private tutoring classes in Vietnam. Econ. Educ. Rev. **26**(6), 683–698 (2007)

Debnath, R. M., Shankar, R.: Improving service quality in technical education: use of interpretive structural modeling. Qual. Assur. Educ. **20**(4), 387–407 (2012)

Debnath, R.M., Shankar, R.: Emerging trend of customer satisfaction in academic process: An application SPC and Taguchi's robust parameter design. The TQM J. (2014)

Duperrin, J.C., Godet, M.: Méthode de hiérarchisation des éléments d ' un système : essai de prospective du système de l ' énergie nucléaire dans son contexte sociétal. [Rapport de Recherche] Centre National de l'entrepreneuriat (CNE) (1973)

Elmuti, D.: The perceived impact of teambased management systems on organizational effectiveness. Team Perf. Manag. 3(3), 179–192 (1997) Retrieved from: https://doi.org/10.1108/13527599710186961

Entrich, S. R.: Shadow education and social inequalities in Japan: Evolving patterns and conceptual implications. Springer (2017)

Entrich, S. R.: Worldwide shadow education and social inequality. When do shadow systems become a threat to equality of educational opportunities, 15–21 (2018)

Entrich, S.R.: Worldwide shadow education and social inequality: explaining differences in the socioeconomic gap in access to shadow education across 63 societies. Int. J. Comp. Sociol. **61**(6), 441–475 (2020)

Entrich, S.R., Bae, S.H.: Extended education at college and its outcomes: An introduction. IJREE Int. J. Res. Ext. Educ. 8(2), 5–6 (2021)

Entrich, S.R., Byun, S.Y.: Supplementary education at college and its consequences for individuals' labor market outcomes in the United States. IJREE Int. J. Res. Ext. Educ. **8**(2), 7–8 (2021)

Entrich, S.R., Lauterbach, W.: Shadow education in Germany: compensatory or status attainment strategy? Findings from the German life study. Int. J. Res. Ext. Educ. **7**(2), 143–159 (2019). https://doi.org/10.3224/ijree.v7i2.04

Entrich, S.R., Lauterbach, W.: Shadow education in Germany: compensatory or status attainment strategy? findings from the German life study. IJREE Int. J. Res. Ext. Educ. **7**(2), 9–10 (2020)

Fadipe, J.O.: Utilizing manpower in the secondary school system: A necessary administrative function for better productivity. Management for quality education in Nigeria (1990)

Fathi, M., Ghobakhloo, M., Syberfeldt, A.: An interpretive structural modeling of teamwork training in higher education. Educ. Sci. **9**(1), 16 (2019). https://doi.org/10.3390/educsci9010016

G., K.: The Curious Case of Coaching in Kota. India Education; indiaeducation.net. (2022, March 8). https://indiaeducation.net/top-colleges/coaching/the-curious-case-of-coaching-in-kota-home-to-the-best-engineering-medical-coaching-institutes/

Giavrimis, P., Eleftherakis, T., Koustourakis, G.: An approach of shadow education in Greece: sociological perspectives. Open J. Sociol. Stud. **2**, 71–82 (2018)

Gonzalez, M.E., Quesada, G., Mueller, J., Mueller, R.D.: International business curriculum design: identifying the voice of the customer using QFD. J. Int. Educ. Bus. (2011)

Gray, J., Laidlaw, H.: Part-time employment and communication satisfaction in an Australian retail organization. Empl. Relat. **24**(2), 211–228 (2002)

Guill, K., Lüdtke, O., Köller, O.: Assessing the instructional quality of private tutoring and its effects on student outcomes: analyses from the German National educational panel study. Br. J. Educ. Psychol. **90**(2), 282–300 (2020)

Harvey, L., & Green, D.: Defining quality. Assess. Eval. Higher Educ. 18(1), 9–34 (1993). Retrieved from: https://doi.org/10.1080/0260293930180102

Hof, S.: Does private tutoring work? the effectiveness of private tutoring: a nonparametric bounds analysis. Educ. Econ. **22**(4), 347–366 (2014)

IBEF, Education Industry Analysis (2020), Retrieved from: https://www.ibef.org/industry/education-prese ntation

Jayant, A., Azhar, M., Singh, P.: Interpretive structural modeling (ISM) approach: a state of the art literature review. Int. J. Res. Mech. Eng. Technol. **5**(1), 15–21 (2015)

Ketokivi, M., Castañer, X.: Strategic planning as an integrative device. Adm. Sci. q. (2004). https://doi.org/10.2307/4131439

Khanam, S., Talib, F.: Modelling the TQM enablers and IT resources in the ICT industry: an ISM-MIC-MAC approach. Int. J. Information Syst. Manag. **1**(3), 2015 (2015)

Kim, Y.C.: Shadow Education, Curriculum, and Culture of Schooling in South Korea. Palgrave Macmillan, New York, NY (2016). https://doi.org/10.1057/978-1-137-51324-3

Kim, YCh., Jung, J.-H.: Shadow Education as Worldwide Curriculum Studies. Palgrave Macmillan, New York (2019)

Kim, Y.C., Gough, N., Jung, J.H.: Shadow education as an emerging focus in worldwide curriculum studies. Curriculum Matters **14**, 8–30 (2018). https://doi.org/10.18296/cm.0027

Knouse, S.B., Fontenot, G.: Benefits of college business internships: a review of the literature. J. Employ. Couns. **45**(2), 61–66 (2008)

Kobolt, A., Žižak, A.: Editorial. Center Educ. Policy Stud. J. **3**(2), 5–8 (2013)

Kosemani, J.M. (Ed.). Comparative education: Emergent national systems. Abe Publishers (1995)

Kuan, P.Y.: Effects of cram schooling on mathematics performance: evidence from junior high students in Taiwan. Comp. Educ. Rev. **55**(3), 342–368 (2011)

Land, R. & Rattray, J.: 'Policy drivers and barriers to implementation', in Eggins, H. (Ed.), Drivers and barriers to achieving quality in higher education, pp. 13–25 Rotterdam, Sense Publishers (2014)

Lee, C.J., Park, H.J., Lee, H.S.: Shadow education systems. In G. Sykes, B. Schneider, & D. N. Plank (Eds.), Handbook of education policy research (2009)

Liu, J.: Does cram schooling matter? Who goes to cram schools? Evidence from Taiwan. Int. J. Educ. Dev. **32**(1), 46–52 (2012)

Liukineviciene, L., Bilbokaite, R.: Major problems obstructing implementation of higher education quality management systems in higher schools. Soc. Res. **2**(23), 80–89 (2011)

Lu, W.M.: Intellectual capital and university performance in Taiwan. Econ. Model. **29**(4), 1081–1089 (2012)

Majumdar, S., Tripathy, S.: Performance evaluation of Indian education sector using interpretive structural modelling. IOP Conf. Series Mater. Sci. Eng. (2018). https://doi.org/10.1088/1757-899X/390/1/012014

Malik, M.A.: Shadow education: evolution, flaws and further development of the term. Soc. Sci. Educ. Res. Rev. **4**(1), 6–29 (2017)

Mandal, A., Deshmukh, S.G.: Vendor selection using interpretive structural modelling (ISM). Int. J. Oper. Prod. Manag. (1994). https://doi.org/10.1108/01443579410062086

Mangla, S., Madaan, J., Sarma, P.R.S., Gupta, M.P.: Multi-objective decision modelling using interpretive structural modelling for green supply chains. Int. J. Logist. Syst. Manag. **17**(2), 125–142 (2014)

Matorera, D.: Quality management systems in education. Quality management systems. A selective presentation of case-studies showcasing its evolution 21–46 (2018)

Meyers, N.M., Nulty, D.D.: How to use (five) curriculum design principles to align authentic learning environments, assessment, students' approaches to thinking and learning outcomes. Assess. Eval. High. Educ. **34**(5), 565–577 (2009)

Motwani, J.: Critical factors and performance measures of TQM. TQM Mag. **13**(4), 292–300 (2001). https://doi.org/10.1108/13683040010362300

Motwani, J., Kumar, A.: The need for implementing total quality management in education. Int. J. Educ. Manag. (1997)

Mukherji U.P.: Private coaching poaches mainstream education; Kolkata News - Times of India (2013) Retrieved from: https://timesofindia.indiatimes.com/city/kolkata/ Private-coaching-poaches-mainstream-education/articleshow/20763491.cms

Mykhailyshyn, H., Kondur, O., Serman, L.: Innovation of education and educational inovations in conditions of modern higher education institution. J. Vasyl Stefanyk Precarpathian Nat. Univ. **5**(1), 9–16 (2018)

Nair, H.V.: Coaching centers come under Supreme Court scanner. India Times (2014). Retrieved from: https://www.indiatoday.in/india/north/story/coaching-centres-supreme-court-scanner-suicide-hrd-ministry-204739-2014-08-20

Nor Anuar, F.: A study on the total quality management (TQM) practices and its association with production workers in Malaysia. SSRN Electron. J. (2018). https://doi.org/10.2139/ssrn.2885615

Ooi, K.B., Bakar, N.A., Arumugam, V., Vellapan, L., Loke, A.K.Y.: Does TQM influence employees' job satisfaction? an empirical case analysis. Int. J. Qual. Reliab. Manag. (2007). https://doi.org/10.1108/02656 710710720330

Parray, Z.A.: Contribution of ICT and research. Educ. Contemp. World **6**(2), 649–653 (2019)

Pathak, K., Nawal, M.K.: ICT in educational institution: need role and importance. IOSR-JHSS J. Humanit. Soc. Sci. **23**(1), 42–46 (2018)

Phadke, M.: *A corner of Pune is fast turning into the Kota for CAs, with a turnover in crores*. (2018) Retrieved from: https://theprint.in/india/governance/a-corner-of-pune-is-fast-turning-into-the-kota-for-cas-with-a-turnover-in-crores/166647/

Phusavat, K., Kanchana, R., Lin, B.: Information requirements for managerial decisions in manufacturing. Bus. Process. Manag. J. (2009). https://doi.org/10.1108/14637150910949489

Power, E., Partridge, H., O'Sullivan, C., Kek, M.Y.C.A.: Integrated 'one-stop'support for student success: Recommendations from a regional university case study. High. Educ. Res. Dev. **39**(3), 561–576 (2020)

Prebble, T., Hargraves, H., Leach, L., Naidoo, K., Suddaby, G., Zepke, N.: Impact of student support services and academic development programmes on student outcomes in undergraduate tertiary student support services and academic development programmes on student outcomes in undergraduate tertiary study: a synthesis of the research (New Zealand, Ministry of Education) (2004)

Prideaux, D.: Curriculum design. Bmj. **326**(7383), 268–270 (2003)

Qureshi, M.N., Kumar, D., Kumar, P.: Modeling the logistics outsourcing relationship variables to enhance shippers' productivity and competitiveness in logistical supply chain. Int. J. Product. Perform. Manag. (2007). https://doi.org/10.1108/17410400710833001

Raj, T., Attri, R.: Identification and modelling of barriers in the implementation of TQM. Int. J. Prod. Qual. Manag. **28**(2), 153–179 (2011)

Rajgopal, K.: Can't regulate coaching centres, Centre tells SC; The Hindu (2014) Retrieved from: https://www.thehindu.com/news/national/states-not-centre-should-regulate-coaching-centres-hrd-ministry-files-affidavit-in-supreme-court/article6332125.ece

Ravi, V., Shankar, R., Tiwari, M.K.: Productivity improvement of a computer hardware supply chain. Int. J. Product. Perform. Manag. (2005). https://doi.org/10.1108/17410400510593802

Sabharwal, N.S:. Extended education at college in india: advancing equity through the extension of public academic support programmes for students from the socially and economically disadvantaged Groups. IJREE Int. J. Res. Ext. Educ. **8**(2), 11–12 (2021)

Sage, A.P., Smith, T.J.: On group assessment of utility and worth attributes using interpretive structural modeling. Comput. Electr. Eng. (1977). https://doi.org/10.1016/0045-7906(77)90029-5

Sahney, S., Banwet, D.K., Karunes, S.: An integrated framework for quality in education: application of quality function deployment, interpretive structural modelling and path analysis. Total Qual. Manag. Bus. Excell. **17**(2), 265–285 (2006)

Seeley, E.: Human needs and consumer economics: the implications of Maslow's theory of motivation for consumer expenditure patterns. J. Socio. Econ. (1992). https://doi.org/10.1016/1053-5357(92)90002-O

Sen, P.: We follow the private tutors not the teachers: an ethnographic insight into educational practices among the students of an Indian city. Int. J. Res. Soc. Sci. **4**(4), 819–840 (2014)

Sila, I., Ebrahimpour, M.: Examination and comparison of the critical factors of total quality management (TQM) across countries. Int. J. Prod. Res. (2003). https://doi.org/10.1080/0020754021000022212

Silova, I.: Private supplementary tutoring in Central Asia. Paris: UNESCO International Institute for Educational Planning (2009)

Singh, R.K., Garg, S.K., Deshmukh, S.G., Kumar, M.: Modeling of critical success factors for implementation of AMTs. J. Model. Manag. **2**(3), 232–250 (2007)

Sit, W.Y., Ooi, K.B., Lin, B., Chong, A.Y.L.: TQM and customer satisfaction in Malaysia's service sector. Ind. Manag. Data Syst. (2009). https://doi.org/10.1108/02635570910982300

Sohani, N., Sohani, N.: Developing interpretive structural model for quality framework in higher education : Indian context. J. Eng. Sci. Manag. Educ. **5**(II), 495–501 (2012)

Stevenson, D.L., Baker, D.P.: Shadow education and allocation in formal schooling: transition to University in Japan. Am. J. Sociol. **97**(6), 1639–1657 (1992). https://doi.org/10.1086/229942

Stone, D.L.: The status of theory and research in human resource management: where have we been and where should we go from here? Hum. Resour. Manag. Rev. (2007). https://doi.org/10.1016/j.hrmr.2007.04.005

Sureshchandar, G.S., Rajendran, C., Anantharaman, R.N.: A holistic model for total quality service. Int. J. Serv. Ind. Manag. (2001). https://doi.org/10.1108/09564230110405299

Talib, F., Rahman, Z., Qureshi, M.N.: An interpretive structural modelling approach for modelling the practices of total quality management in service sector. Int. J. Model. Oper. Manag. (2011). https://doi.org/10.1504/ijmom.2011.039528

Tarí, J.J.: Components of successful total quality management. TQM Mag. **17**(2), 182–194 (2005). https://doi.org/10.1108/09544780510583245

Teh, P.L., Yong, C.C., Arumugam, V.C., Ooi, K.B.: Role conflict in information systems personnel: a TQM perspective. J. Appl. Sci. (2009). https://doi.org/10.3923/jas.2009.2701.2713

Teh, P.L., Ooi, K.B., & Yong, C.C.: Does TQM impact on role stressors? A conceptual model. Industrial Management and Data Systems. (2008) https://doi.org/10.1108/02635570810904596

Thakkar, J., Kanda, A., Deshmukh, S.G.: Interpretive structural modeling (ISM) of IT-enablers for Indian manufacturing SMEs. Inf. Manag. Comput. Secur. (2008). https://doi.org/10.1108/09685220810879609

Tran, P.P., Kuo, K.C., Lu, W.M., Kweh, Q.L.: Benchmarking in Vietnam universities: teaching and research and revenue efficiencies. Asia Pac. Educ. Rev. (2020). https://doi.org/10.1007/s12564-019-09622-z

Vouzas, F., Psychogios, A.G.: Assessing managers' awareness of TQM. TQM Mag. (2007). https://doi.org/10.1108/09544780710720844

Waibel, S., Rüger, H., Ette, A., Sauer, L.: Career consequences of transnational educational mobility: a systematic literature review. Educ. Res. Rev. **20**, 81–98 (2017)

Warfield, J.N.: Developing interconnection matrices in structural modeling. IEEE Transactions Syst. Man Cybern. **SMC 4**(1), 81–87 (1974). https://doi.org/10.1109/TSMC.1974.5408524

Wisner, J.D., Corney, W.J.: Comparing practices for capturing bank customer feedback - internet versus traditional banking. Benchmark. Int. J. (2001). https://doi.org/10.1108/14635770110396647

Yang, C.C.: The impact of human resource management practices on the implementation of total quality management: an empirical study on high-tech firms. TQM Mag. (2006). https://doi.org/10.1108/09544780610647874

Yung, K.W.H.: Learning English in the shadows: understanding Chinese learners' experiences of private tutoring. TESOL Q. **49**(4), 707–732 (2015)

Yusuf, Y., Gunasekaran, A., & Dan, G.: Implementation of TQM in China and organisation performance: an empirical investigation Total Qual. Manag. Bus. Excell. 18:5, 509–530 (2007) Retrieved from: https://doi.org/10.1080/14783360701239982

Zairi, M.: Managing customer satisfaction: a best practice perspective TQM Mag. (2000) https://doi.org/10.1108/09544780010351670

Zhang, Z.: Implementation of total quality management: an empirical study of Chinese manufacturing firms Labyrint Publication (2000) https://doi.org/10.1080/09544129000000046