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EVALUATING THE PRACTICES OF FLEXIBILITY MATURITY FOR THE SOFTWARE PRODUCT AND SERVICE ORGANIZATIONS

Sanjai Kumar Shukla, Sushil*

Department of Management Studies, Indian Institute of Technology Delhi, Vishwakarma Bhawan, Shaheed Jeet Singh Marg, New Delhi, 110016, India

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ABSTRACT

The competitive advantage offered by flexibility has drawn considerable attention from the academic and practitioner community. The existing literature primarily focuses on means to achieve flexibility through information system (IS) exploitation. There is a noticeable absence of a comprehensive flexibility evaluation and implementation framework for organizations, engaged in the delivery of software products and services. This paper proposes twenty-three practices graded in six maturity levels to fill this gap. These practices will improve the understanding, evaluation, and implementation of flexibility in the organizational setting.

1. Introduction

The extant literature primarily deals with measuring select flexibilities, e.g., machine flexibility, financial flexibility, human resource flexibility, etc. The available mechanisms of flexibility evaluation are different across organizations and industry sectors. There are multiple views of outcomes of similar types of flexibility across industries. This multiplicity of views causes poor applicability and inconsistency in the interpretation of the results of flexibility evaluation, and largely limited to academic contemplations. The existing literature views the flexibility from a micro perspective and evaluates different types of organizational flexibility. There is a noticeable absence of a comprehensive flexibility evaluation framework from a macro perspective, which results in organizational planning and decisions that ignore this important strategic tool.

There is a limited study of the evaluation of flexibilities for information technology (IT) organizations delivering software products and services which is the current scope of this paper. In the other industry sectors also, there is a dearth of literature for comprehensive treatment for flexibility. The present situation presents a challenge to the standardization of the flexibility evaluation approach, which could also be used to guide its enhancement. This challenge has been addressed in this paper by identifying the standardized practices that lead to the conceptualization of flexibility maturity model (FMM) for IT organizations. Five-phase flexibility maturity model extending the definition of maturity levels of Capability Maturity Model Integration for Development Version (CMMI-DEV, V1.3) (2010) in professional services of law firms has been conceptualized by Rooymans (2010). The conceptualization of FMM for product and services organization in IT sector provides an opportunity to explore the concept in a novel and neutral manner.

The standardized practices/processes are typically part of maturity models. The maturity in individuals reflects predictability of actions, effective functioning, and building relationship for upholding themselves and contribute to society (Greenbergerrage & Sorensen, 1971). Similar anticipation is from the mature organization exhibiting relevant capability on maturation path (Forstner, Kamprath, & Röglinger, 2014). The maturity models provide guideline to enhance maturity levels of given capability to meet the organizational goals (De Bruin, Rosemann, Freeze, & Kulkarni, 2005; Poppelbus, Plattfaut, & Niehaves, 2015). Flexibility as organizational capability is taken in this paper to be further determined and evaluated in different maturity levels. There are recommended practices corresponding to different maturity levels that measure the given organizational capability (Linhart, Klaus, & Roglinger, 2018). Along similar lines, this paper also identifies practices composed of flexibility indicators that correspond to the six flexibility maturity levels. The indicators are ways and means to enhance organizational flexibility touching every aspect of organizational functions. Wadhwa and Rao (2003) proposed six maturity levels in their FMM. The FMM encompassing the business environment, value chain, and entire ecosystem is proposed by Sushil (2012a, 2016b), whose research is utilized as a base framework in this study. There are six maturity levels in this maturity model:

i) Flexibility in individual processes at the operational level (Level-1): At this level, an organization creates options and make changes in

* Corresponding author.
E-mail addresses: shuklasanjai@rediffmail.com (S.K. Shukla), sushil@dms.iitd.ac.in, profsushil@gmail.com (Sushil).

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operational processes resulting in numerous types of flexibilities.

ii) Flexibility in interactions of processes (Level-2): This level envisages the effective interactions among various processes. For example, marketing flexibility interacting with technological flexibility for speedy outcomes.

iii) Flexibility in actors (Level-3): This level envisages the flexibility in all stakeholders, resulting in a flexible workforce and leadership.

iv) Strategic flexibility (Level-4): The organization at this maturity level has flexibility to synthesize the opposite options such as globalization and localization. The organizational transformation is enabled at this level (e.g., IBM moving from products to solutions company)

v) Operational flexibility in value network (Level-5): Flexibility at this level causes the interaction with partner organizations. The flexibility alignment of processes is done so that rigid processes become flexible for smoother interactions across organizations in the value network.

vi) Strategic flexibility across the ecosystem (Level-6): The flexibility at this level enables the speedy interaction with elements beyond value network such as government and society.

The standardized practices corresponding to above-listed maturity levels are identified in this paper empirically, i.e., exploratory and confirmatory factor analysis followed by interview of practitioners in two phases to know about the workable recommendations for IT organizations. The interrelationship among the practices of different flexibility maturity levels is analyzed qualitatively through interviews. The study of leading Indian IT companies, i.e., TCS, L&T, MindTree, Wipro, and Infosys reveals that transformation of every organizational process is indispensable for progress that can be steered using the comprehensive framework based on indicators (Mendonca, Mandavia, & Pramanik, 2018). This paper categorizes organizational flexibility using FMM, provides guidelines for the assessment of flexibility maturity, and devises ways of tracking its progression from lower to higher levels. The capability induced at the highest maturity level corresponds to ecosystem transformative capability to establish a leadership position.

2. Literature review and theoretical background

This section identifies the indicators and their context of flexibility stated in the literature. The flexibility provides a wide range of breakthrough success in developing software (Faraj & Sproull, 2000; Grover & Kar, 2017; Partovi, 1994). The organizational flexibility is important for fixing product and market mismatches under the uncertain situation, and the prioritization of changes (Haldar, Rao, & Momaya, 2016; Maruping, Venkatesh, & Agarwal, 2009; Nidumolu & Subramani, 2004). The key factors that result in project failure are identified by Hughes, Dwivedi, Rana, and Simintiras (2016). Working on these factors through a practice-based approach is feasible through indicators and practices of FMM. For example, the relationship building, project management, risk management, capability building, avoiding resistance to change management, communication, and requirement focus are part of the indicator set of FMM. This approach gives confidence in the FMM application in real-world scenarios to avoid project failures and institute flexibility. The adoption of the agile approach is required for institutionalizing the flexibility in the design and development of software (Germain & Robillard, 2005; Gromoff, Bilinkis, & Kazantsev, 2017; Paulk, 2002). The flexibility in products and processes facilitates the exploitation of organizational resources (Sojer & Henkel, 2010). The flexibility requires speedy organizational interactions and a buffer for uncertainty which further needs resources (Nerur, Mahapatra, & Mangalaraj, 2005; Steinbring, Motschnig, & Pitner, 2013). The exploitation of own resources, resources of the organizational network and institutional procedures are desired for enhancing flexibility within the network (Ravichandran, 2017; Sushil, 2016a; Swafford, Ghosh, & Murthy, 2008). The indicators are aligned with the definitions of all six flexibility maturity levels. The facilitators, influencers, enablers, and key performance outcomes in the context of flexibility are identified as indicators. The comprehensive scope of flexibility is utilized to produce an exhaustive set of indicators. It includes the attributes of flexibility, such as agility, responsiveness, quickness, cost-effectiveness, integration, leanness, speed, fast learning, change, availability of options, and organizational control (Avazpour, Ebrahimi, & Fathi, 2014; Qumer & Henderson-Sellers, 2008; Sushil, 2012b; Volberda, 1997).

The commonly understood fact about flexibility is uncertainty mitigation. Flexibility is important for mitigation of uncertainty in the context of the product, price, political situation, and business environment. Building the flexibility for uncertainty and risk mitigation finds extensive literary support during the design and development of software (International Organization for Standardization (ISO), 2008; Mathew & Chen, 2013). The risk management functions are taken as an indicator in the current study. The other commonly understood term is employee flexibility. The employee flexibility pertains to responding to stimuli, adaptation, handling depression, team dynamics and leveraging opportunities (Fresco, Williams, & Nugent, 2006; Lin & Ho, 2016; Mann & Marshall, 2007; Martínez-Sánchez, Vela-Jiménez, Pérez-Pérez, & De-Luis-Carnicer, 2011). The flexibility is related to versatility to move between jobs requiring expertise in different technology domains. The multi-skilling and concurrent execution of tasks is a major pointer of employee flexibility (Iravani, Van Oyen, & Sims, 2005). These are used as indicators. Similarly, the context of flexibility identified for the indicators corresponding to six flexibility maturity levels is given in following subsections and summarized in the Appendix A1.

2.1. Indicators of first flexibility maturity level

This section deals with the context of flexibility related to individual processes at the operational level. In the IT organizations, the relevant processes about software design are requirement analysis, design, development, testing, acceptance, deployment, maintenance, quality assurance, disposal and CASE tool usage (International Organization for Standardization (ISO), 2008, 2010). The flexible organizations put the focus on productive activities for greater benefits. Germain and Robillard (2005) found that agile teams give priority to coding as a focussed activity, which is core work in IT organizations. The requirement collection process should facilitate change at a later stage of development. There is recommendation for controlled requirement changes for greater benefits, that make it an important indicator (Maruping et al., 2009). Controlled-flexible development is supported by Nidumolu and Subramani (2004). The multiple actors' involvement is mandated in agile methodology for the flexible development process. The design process is a reflection of all technical strength of the organization and vital for flexibility. The design paradigms help for greater return on investments. The service orientation in design enables good decisions among managers and technologist (Gulledge & Deller, 2009). The focus on technical design parameter enhances agility (Paulk, 2002). Tseng and Lin (2011) found that first-time-right design is an agility provider of an organization. Murguzur, Intxausti, Urbieta, Trujillo, and Sagardui (2014) proposed the publish/subscribe, and object reuse for product flexibility. The component granularity in the design of software enhances product flexibility (Subramanyam, Ramasubbu, & Krishnan, 2012). The support processes interact with requirement, design and development processes. The operational infrastructure includes the deployment of computer-assisted software engineering (CASE) tools for automation. In development processes, this infrastructure helps in model-based engineering for speedy accomplishments to enable flexibility in support processes. The knowledge management effectiveness impacts all process areas of organizations. Chan and Thong (2009) introduced knowledge management as key aspects of agile methodology. The consideration of different production scenarios in software

production reduces the uncertainty of product use (Chastek, Donohoe, & McGregor, 2009). The other indicators relating the requirements engineering to achieve the completeness, consistency, and unambiguity are taken from the standards (Capability Maturity Model Integration for Development Version (CMMI-DEV, V1.3, 2010; International Organization for Standardization (ISO), 2008, 2010). Along with engineering aspects, sound project management practices and tools are required for flexibility (Wells, 2012).

2.2. Indicators of second flexibility maturity level

This section addresses the indicators required to enable interactions among organizational processes. These indicators respond to different types of uncertainty, turbulence, business environments and exposure to the external world, which are facilitated by the flexibility in interaction, alignment, and interdependence. The dichotomy of certifications on project success is brought out by Hughes, Dwivedi, and Rana (2017). The harmonized compliance of different frameworks and regulations requires the interaction of organizational processes to produce results (Gong & Janssen, 2012).

In many cases, compliance with CMMI and other certifications are required for getting business orders. Compliance indicates the availability of the required resources and process deployment in the organization. The agile approach covering aspects of rapid prototyping and close customer interactions provides flexibility in the product lifecycle (Paulk, 2002). The targeted initiatives for speedy business model innovation and organization's resource utilization are crucial for flexibility (Gong & Janssen, 2012; Mason & Mouzas, 2012). Chow and Cao (2008) identified the factors of successful agile methodology that include the use of software engineering techniques, project management process, and customer involvement. These indicators require interactions among organizational processes for creating flexibility in different perspectives.

There are benefits of organizational process control that results in project success and organizational change (Volberda, 1997; Wang, Ju, Jiang, & Klein, 2008). The rapid prototyping using automated tools enables the flexibility in the processes from design and implementation (Paulk, 2002). The openness to the external environment for decision making enables the flexibility in the interaction between processes and people (Monteiro, Mol, & Birkinshaw, 2017). Das and Patel (2002) examined the flexible requirement and type of flexibility using an audit tool. The flexibility aspects of product audit enabling the interaction of technical and administrative processes. Lin and Wang (2011) identified system function as important audit criteria among technical support and service, cost, and data processing that enable flexibility in the product. The system function has constituents like system requirements, operating interface, data storage, stability, security, and flexibility. The benchmarking is important for strategic selection and prioritization among available options (Partovi, 1994). Focus on alignment, coordination, and intervention within the team enables the organization to achieve flexibility goal. Coordination among actors results in effective development and better outcomes (Faraj & Sproull, 2009). The flexibility in the interaction of processes covering the technical and managerial aspects is reflected in the integration of the separately developed components of the different organization (International Organization for Standardization (ISO), 2008). Flexibility in the IT organization is shown by acceptance of agile methods as a way of solution delivery. The flexible strategy takes care of uncertainty and empowers the quick response by shortening the components of the software development life cycle. The agile methodology is taken as an indicator of organizational flexibility which enables collaboration among various stakeholders and organizational processes.

2.3. Indicators of third flexibility maturity level

The flexibility in actors corresponds to third maturity level after the flexibility in the individual process level, and flexibility in interactions of processes are achieved. The indicators associated with different actors interacting with the organization are taken into consideration. Kara, Kayis, and O'Kane (2002) studied the impact of human factors on flexibility during turbulent trading conditions. They noted that the elements, i.e., organizational structure, technology, information system, and human resource have an impact on flexibility. The access of information to all stakeholders assists in the flexibility in decision making and takes the suppliers, partners, and customers to the common platform. Bajgoric (2000) emphasized the efficiency of information sharing for agile management using web technology. For outside actors, Narasimhan, Talluri, and Das (2004) noted the importance of the supplier involvement and their responsiveness in psychometric constructs for flexible enterprises. The proactiveness of human resource positively affects the flexibility of the organization. Fresco et al. (2006) conceptualized the explanatory and coping flexibilities to mitigate depression and anxiety symptoms of the workforce. Martínez-Sánchez et al. (2011) found a positive relationship between flexible human resource practices and innovativeness. Haley and Miller (2014) found that short leave provisions enhance employee flexibility by relieving stress and sleep difficulties. The impact of technology exploration on manufacturing flexibility is done by Javier, Leopoldo, and Antonia (2014); the same is examined for IT organization by making it as an indicator. The flexible work design and structure positively impacts employee flexibility (Hoeven & Zoonen, 2015; Naranjo-Gil, 2009).

2.4. Indicators of fourth flexibility maturity level

This section deals with the context mentioned in the literature for the indicators related to strategic flexibility. The strategic flexibility refers to the ability of the enterprise to cope up with changing business environment by streamlining the organizational strategies. Goldstein, Petrie, and Sherif (2010) emphasized ground management for agile methods. The system and organization structure are important enablers for the strategy process. Steinbring et al. (2013) identified the organizational level focal points, i.e., communication mechanism and formalization for strategic flexibility. The unified strategic intent and different modes of communication in integrated form are vital for flexibility (Niemann-Struweg, 2014). The flexible system structure is a good means for buffering against uncertainty (Iravani et al., 2005). In IT organizations, bureaucracy and formal structure hinder the agile innovation (Nerur et al., 2005). The empowered individuals in a multidimensional context aids in realizing the organizational flexibility (McEwan & Sackett, 2001). The data-driven decision support helps in strategic planning and flexibility (Lee & Siau, 2001; Seng & Chen, 2010). The constant adaptation, readiness to the change and prediction of the market and customer preferences are mandatory to exhibit higher flexibility (Dhir, 2017; Sheffield & Lemétayer, 2012; Sushil, 2012b). The organizational flexibility is important for fixing product and market mismatches under the uncertain situation and strategic decision comprehensiveness to avoid project failure (Atuahene-Gima & Li, 2004; Hughes et al., 2016; Misra, Kumar, & Kumar, 2009).

Investment is required to achieve the strategic flexibility. Study of the competitive framework of bigger organizations shows that they often make investments in other countries for strategic purposes. Brouthers and Dikova (2010) found that under demand uncertainty, strategic flexibility is directly associated with the acquisition decision using real option. Volberda (1997) explored internal and external options for strategic flexibility and recommended for new product and market combinations. The foreign investments, FDI and export-related investments have a positive impact on organizational flexibility and favorable during economic crises (Lee & Makhija, 2009). There is increased payoff and value under uncertainty for the R&D investments (Santiago & Vakili, 2005). Fisch and Zschoche (2013) found that the net present value, growth option, and operational flexibility results in the establishment of a new site which is a pointer of flexibility at the fourth

maturity level.

Collaborations and integration are required for making an effective and predictable strategy under external uncertainty. Lin, Chiu, and Tseng (2006)) proposed a collaborative relationship for strategic flexibility. The strategic integration of all processes necessitates the organizational transformation by assimilating the opposite options by showing the strategic flexibility (Sushil, 2012b). Ganguly, Nilchiani, and Farr (2009)) shown that for agile organizations, the cost-effectiveness is a major indicator of flexibility.

2.5. Indicators of fifth flexibility maturity level

The indicators of operational flexibility in the value network are related to capability creation, reorganization of resources, contracts, maintaining supply chain configurations and coordination among members. The reorganizational capability for resources in the value chain is shown by flexible organizations. The resources in the context of IT organizations are team members, IT systems, and support infrastructure. The benefit of team reorganization has been established in national perspective for value chain flexibility (Mann & Marshall, 2007). The realignment of business and IT systems are required continuously for flexibility (Ullah & Lai, 2013). Lynch, Mason, Beresford, and Found (2012) proposed different configuration of business comprising of the market, product, and their relationship in the stable and uncertain business environment. The resource and competency sharing among members is advised for flexibility in the value chain (Yusuf, Gunasekaran, Adeleye, & Sivayoganathan, 2004; Sushil, 2018).

The technological capabilities help for sustained growth in the long term. The absorptive and technological capabilities result in faster product development for high tech enterprises (Tzokas, Kim, Akbar, & Al-Dajani, 2015). The market share generally determines the relative standing of the organization in the value chain. The perspective of reputation, prestige, and goodwill create standing of organizations. The options for the organization with higher standing increases for loans, collaborations, and support from other organizations, therefore the flexibility of organization upsurges. The analogy exists between an individual in social networks and organization in the value chain. Adams and Balfour (2010) have given two dimensions of relative standing which consists of social responsibility and compliance. The cost of establishing such standing and the flexibility benefits are subject of this research work by making it an indicator. The corporate size is the outcome of the continuous evolution of the flexible organization. Livermore (2008) indicated that corporation size is one of the factors that impact the agile methodology. The indicator, i.e., strategy recalibration, refocus, and reorganization of resources for flexibility has emerged from a study of Nadkarni and Herrmann (2010).

The contracts play an important role in components availability. Li and Kouvelis (1999) defined time-inflexible contracts without specifying the exact time of purchase. The cost of such contracts and flexibility benefits are studied by making it an indicator. The supply chain elements consist of distributor, logistics, sourcing and integration platforms. Garavelli (2003) found that different configurations are possible with available supply chain elements. The organization may exercise limited flexibility, total flexibility, and optimal flexibility with desirable supply chain elements. The tradeoff among efforts associated with maintaining such optimality, flexibility, and strategic inventory is studied by making these factors as indicators (Christopher, 2000). In the supply chain, the trust-based transactions greatly enhance flexibility. There is a positive correlation between the flexibility and trust of distributors in the supply chain (Lin et al., 2006; Song & Yu, 2009).

2.6. Indicators of sixth flexibility maturity level

The ecosystem has constituent elements inside and outside the industry in which organizations operate. It provides opportunities for innovations and cooperation. For flexibility in the entire ecosystem, intense enablers in all spheres (product, organization, industry, society, and government) are considered. The focus and synergy among stakeholders speed up the accomplishment of the goals. The flexible business models integrate corporate ownership, network influence, and transactional relationships. Stephenson and McDermid (2005) advised for deriving flexibility requirements from pointers of customer uncertainty in the way the requirements are expressed. This allows the designer to quickly incorporate elements of flexibility in architecture and proceed with the design even when the requirement is expected to change. Amorim, Almeida, McGregor, and Chavez (2014) analyzed the technical and business issues for an ecosystem and concluded that extensibility and scalability are required for flexible architecture. For the highly adaptive organization, the visibility of IT infrastructure exploitation is a good indicator of flexibility. The IT infrastructure exploitation has a positive impact on supply chain flexibility that results in competitive business performance (Chen, Papazafeiropoulou, & Dwivedi, 2010; Swafford et al., 2008). International entrepreneurship has a greater impact on an uncertain environment than the use of networks (Helm & Gritsch, 2014). The motivation of individuals contributes to a stewardship-oriented culture which is essential for proactiveness and flexibility (Zahra, Hayton, Neubaum, Dibrell, & Craig, 2008). Under increasing variability the entrepreneurial orientation results in higher performance and flexibility, therefore it is used as an indicator (Patel, Kohtamäki, Parida, & Wincent, 2015). Swafford et al. (2008) advised for the enterprise-wide IT integration for the flexible supply chain. Meyer et al. (2014) advised improving feedback control strategy for decisions in dynamic contexts. There are case studies on individual organizations for building global brands for being flexible in crises and plan the investment for this purpose (Al-Kwifi & Ahmed, 2014). The competitive scheme of global market dynamics requires the anticipation of customers' requirement and providing value beyond functional requirements for flexibility at the ecosystem level (Fauska, Kryvinska, & Strauss, 2014; Oh, Chen, Wang, & Liu, 2015). The product flexibility, efficiency, and various trade-offs are subjects during formal reviews and controls mandated by standards (International Organization for Standardization (ISO), 2008; Wang et al., 2008). The impact of formal reviews is analyzed for comprehensive flexibility by making it an indicator.

For highly flexible organizations, the use of technological platforms for community building and establishing relationship are noticed. The community building for strategic innovations and competitive advantages are advised for flexibility (Krieger & Müller, 2003; Zhao, Lu, Wang, Chau, & Zhang, 2012). Within the industry and value chain, there are many benefits of this relationship building for instituting the flexibility. The IS applications deployed to facilitate the inter-firm relationships of the business partners, channel partners, and customers positively contribute to firms flexibility (Ngai, Chau, & Chan, 2011; Saraf, Langdon, & Gosain, 2007). The extensive collaborations lead to sharing economy enabled by technological platforms leads to the flexibility of the customers, producers, and members of the ecosystem (Haile & Altmann, 2016; Sutherland & Jarrahi, 2018). The e-platforms, e-services, and social media help for demand generation and stay competitive in a turbulent business environment (Fauska et al., 2014, Dwivedi, Rana, & Alryalat, 2017; Rust & Kannan, 2003). The dominant player in the industry used social objective as a vehicle for growth where the application of products can provide substantial value. The organizations contributing to societal goals have considerable influence to impact the business environment factors like government policies, political factors besides social and economic factors (Yin & Jamali, 2016). The locational advantage significantly facilitates business expansion without hassle (Elg, Ghauri, & Schaumann, 2015). Sim, Ong, Agarwal, Parsa, and Keivani (2003) studied the Singapore role for investments for business growth. In the case of IT organizations, the impact of institutional frameworks that include policy and location influence is taken as an indicator in the current study.

3. Research Methods

There is a dearth of literature on the practices of flexibility maturity. Therefore an exploratory factor analysis (EFA) is used to structure possible factors as practices. The survey-based approach provides factual information about indicators from respondents. There are six questionnaires, each corresponding to a flexibility maturity level. The questionnaire items are the indicators of each flexibility maturity level from the Appendix A1. These indicators are the items of analysis for questionnaire survey resulting in practices to achieve flexibility. The indicators are tested by framing the statements utilizing the cost of flexibility and benefits noted in the literature survey. All six questionnaires were evaluated by a group of seven senior professionals from the IT organizations developing software for clients, before being administered to target respondents. The respondents make an appropriate choice ranging from 1 to 5 for each item (to achieve the of indicators' objectives) after analyzing for cost, constraints and resource requirements related to the benefits of flexibility. The Likert scale from 1 to 5 (strongly disagree to strongly agree) has been used to get the simplified response as there are eighty-five questionnaire items. Use of more levels in the scale, e.g., 1 to 7 for a large number of questions may lead to cognitive and time overheads. The use of (1-5) scale is justified by Kim, Oh, Shin, and Chae (2009) for identifying the factors. There are a large number of studies utilizing such scale for identifying the relevant factors in information systems research (Dwivedi, Kapoor, Williams, & Williams, 2013; Kapoor, Dwivedi, Piercy, Lal, & Weerakkody, 2014; Shareef, Kumar, Dwivedi, & Kumar, 2016). An example of a statement dealing with the flexibility indicator "model-based engineering" of Appendix A1 is as follows. "The benefits of model-based engineering using Computer Assisted Software Engineering tools outweigh the associated investments. 1-Strongly disagree, 2-Disagree, 3- Neutral, 4-Agree, 5- Strongly agree." The confirmatory factor analysis is done using the same questionnaire. However, the deleted items during EFA are not considered while validation of practice composition.

The interviews with senior practitioners are facilitated by members of the professional network. The eighty-five questionnaire items are divided into three sections (having 34, 25, 26 questions each). The option is given to respond at least one section as respondents indicated that answering all the eighty-five questionnaire items is difficult.

3.1. Profiles of respondents

The target respondents for the survey are team leaders and project managers working in IT organizations with experience levels of more than five years. The optimal cost and benefit have been built into responses. Mostly the responses are from members of the professional network and the team members working under them and their colleagues. The responses are primarily from IT companies located in different IT hubs of India (Delhi, Gurgaon, Bangaluru, Noida, Pune, Hyderabad) that includes big companies like TCS, HCL, Intel, Samsung, Microsoft, NIIT Technologies among the start-ups and mid-size organizations. The students of MBA executive programs in Delhi/ NCR were also part of the respondent group. Multiple copies of a printed questionnaire are given to contact persons in different organizations, and multiple responses from same organizations are received. The interviews have been conducted with senior practitioners with leadership experience in organizational management, divisional and unit heads in private and government organizations in the IT sector.

3.2. Factor analysis (EFA and CFA)

The responses are analyzed using EFA to identify practices corresponding to flexibility maturity levels followed by CFA and interviews of senior practitioners. The responses are analyzed separately at each of the six flexibility maturity levels using IBM SPSS 20. The varimax rotation was used to maximize factor loading for better factor structure (Tabachnick & Fidell, 2007). The confirmatory factor analysis has been used to empirically validate the practices identified for all the six maturity levels. The model (Appendix B2) is conceptualized based on EFA output. Same factor structure is used in CFA but with a larger sample size of 150 respondents for each of the six maturity levels. The analysis is carried using SPSS-AMOS software version 20.

3.3. Two-phase interview

This is a unique study where respondents from both private and government sectors participated. A semi-structured interview was conducted to strengthen the output of CFA. The process of achieving organizational flexibility by strengthening the indicators within the practices is explained to practitioners before starting the interview. The compositions of practices from indicators are also explained. The practitioners' comment on the following issues for each flexibility maturity level is sought during the interviews: i) Relationship between flexibility indicators and practices they comprise; ii) Relationship between practices and flexibility maturity level they comprise; iii) Relationship between different flexibility maturity levels' practices; iv) Expected benefits, constraints of indicators/practices are strengthened to enhance flexibility, including attitudes of downstream employees and senior management; v) Importance of deleted items in reliability analysis; and vi) Suggestions for inclusion of any additional indicator corresponding to a practice.

The interview with twelve practitioners has shed light on the application of flexibility maturity level practices. The Indian perspective on the applicability of the practices is sought through another set of interviews of thirty practitioners by explaining the broad objective of each maturity level. This interview is expected to highlight maturity level achievable in Indian IT organizations.

4. Results of factor analysis and Interviews

The EFA has resulted in practices corresponding to six maturity levels composed of flexibility indicators. The information about practices of flexibility is not visualized in the questionnaire. Therefore response bias favouring select practices is eliminated. The nonresponse bias helps the extrapolation about the magnitude of bias (Armstrong & Overton, 1977). The active persuasion of non-respondents has resulted in the filling of questionnaire which broadly indicated no meaningful bias w.r.t educational, experiential background or locational differences of respondents. Nonresponses significantly guided the method of questionnaire administration in this study. The interviews also confirm the broad findings of this study. The mix-method approach (survey and interview) helped in eliminating any meaningful bias towards questionnaire items.

4.1. Results of exploratory factor analysis leading to practices

The items are deleted to achieve the minimum threshold of reliability parameters given in Table 1. As the reliability parameters are within the accepted range, further analysis has progressed. The factors (practices) having eigenvalues above one are retained and given in Appendix A1 along with the rotated components. Twelve items (marked with *** in Appendix) are deleted to improve the reliability parameters: multiple actors' involvement in the requirement process, multiple formats of requirement collection, multiple modes of requirement collection, focus on completeness of requirements, focus for unambiguous requirement, first time right design approach, use of publish/subscribe methodology, object reuse practice, granular design approach, organizational support for coping and explanation to anxious employees,

Table 1
Reliability parameters of six questionnaire surveys

	Actual Values of parameters						Acceptance range of values in this study	Reference for accepted values
	Maturity level-1 Questionnaire	Maturity level-2 Questionnaire	Maturity level-3 Questionnaire	Maturity level-4 Questionnaire	Maturity level-5 Questionnaire	Maturity level-6 Questionnaire		
No of organizations targeted	Contact persons in 72 IT organizations are identified and the questionnaire is circulated to them. This excludes participants of MBA/PGDM program of NCR based institutes. Multiple responses from same organizations are received.							
No of responses used	108	100	104	95	84	115	Item to Response ratio	Gorsuch, 1983
Questionnaire items	20	14	9	16	11	15	> = 5:1	
Cronbach's alpha	.714	.752	0.810	0.863	0.767	0.783	> = 0.7	Nunnally, 1978
KMO	0.738	.653	0.764	0 .816	0.694	0.721	> = 0.6	Kaiser, 1974
Determinant	0.216	.046	0.047	0.005	0.079	0.033	> = 0.00001	Field, 2000
Sig (p-value) At 95 % level of significance	0.000						< = 0.05	-
Diagonal element of anti-image matrix	> = 0.5						> = 0.5	-
Non-redundant residuals with absolute values greater than value 0.05	50%	48%	50%	47%	49%	46%	< = 50%	Hair, Anderson, Tatham, & Black, 1998
Factor Loading pertaining to EFA	Refer Appendix A1						> = 0.5	Hair et al., 1998

Note: *means that questionnaire of maturity level1,2 are grouped in Section1. Maturity level 3,4 and 5,6 questionnaires are grouped in Sections 2 and 3 respectively for ease of questionnaire administration

trust-based transactions, and selective feedback (formal/management reviews). The analysis indicates the disagreement on the inclusion of these items where benefits may not be commensurate with the investment. It is interesting to observe that for many deleted items, their broad counterpart is accepted which conforms to this study's decision to ignore micro details and get a broader perspective of flexibility. For example, comprehensive feedback is already accepted and includes the scope of selective feedback which is deleted.

4.2. Validation of practices using confirmatory factor analysis

The confirmatory factor analysis has been used to empirically validate the practices identified for all the six maturity levels using EFA. The CFA results are summarized in Appendix B2. It is observed that factor "Collaboration and Experimentation" at maturity level-4 is better explained by splitting as two separate factors namely Collaboration and Experimentation. In spite of significant correlation (0.62), these are considered as two distinct practices as model fit indices are adequate for fourth maturity level. The splitting of factor, i.e., "Product and risk management in software delivery" is not attempted as it is constituted by two distinct indicators only. Convergent validity was established as the factor loadings on respective latent constructs is more than 0.60 (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). The adjusted goodness of fit index (AGFI), goodness of fit index (GFI), root mean square error of approximation (RMSEA), and comparative fit index (CFI), Normed Fit Index (NFI), Tucker-Lewis Index (TLI) are considered as model fit indices. The analysis is carried using SPSS-AMOS software version 20 and support of threshold values are sought from literature: Chi-Square/Degrees of Freedom < 3.0 (Marsh & Hocevar, 1985), CMIN/DF > 0.05 (Wheaton, Muthen, Alwin, & Summers, 1977), RMSEA < 0.08 (Browne & Cudeck, 1993), GFI > 0.90 (Joreskog & Sorbom, 1984), AGFI > .8, (Joreskog & Sorbom, 1981), CFI > 0.90 (Bentler, 1990), TLI > 0.90 (Bentler & Bonett, 1980), and NFI > 0.90 (Bollen, 1989). The composite reliability (CR) > 0.60 and Average Variance Extracted (AVE) > 0.50 for construct validity (Fornell & Larcker, 1981). The retaining of indicators is preferred over the deletion of items to get better model fit indices (AGFI and GFI values). However, their values are quite close to 0.9, which is adequate for this study.

4.3. Results of interviews

The viewpoints of practitioners on the practices of all flexibility maturity levels are summarized in Fig.1. The respondents' feedback can be used as an additional guideline to institute flexibility in the organization. For first maturity level practices, the respondents indicated need to improve organization-specific select indicators to gradually achieve flexibility in individual processes. The emphasis on minimal time lag between expected benefits and the time of the practices' deployment and flexibility for long-term benefits and sustenance was envisaged. The time constraint is considered more potent than the financial constraint for adopting these practices. Some practitioners highlighted the inability to introduce flexibility improvements with ongoing assignments.

For second maturity level practices, the practitioners emphasized the achievement of first flexibility maturity level and agile methodology adoption to achieve the second flexibility maturity level. The flexibility enabled by IS causes the improved interaction among processes by enhanced integration of output of one process to the input of another process. The processes involved in the design and development of software collaborate to make it for final use, which necessitates organization-wide decisions, interactions, and executions.

At third maturity level practitioners indicated that the overall organizational culture and systematic effort are crucial. The enhanced budget provisions for human resource development and the creation of specialized skills are observed for actors' flexibility. The quality of hire is also observed in certain responses. The practitioners showed an

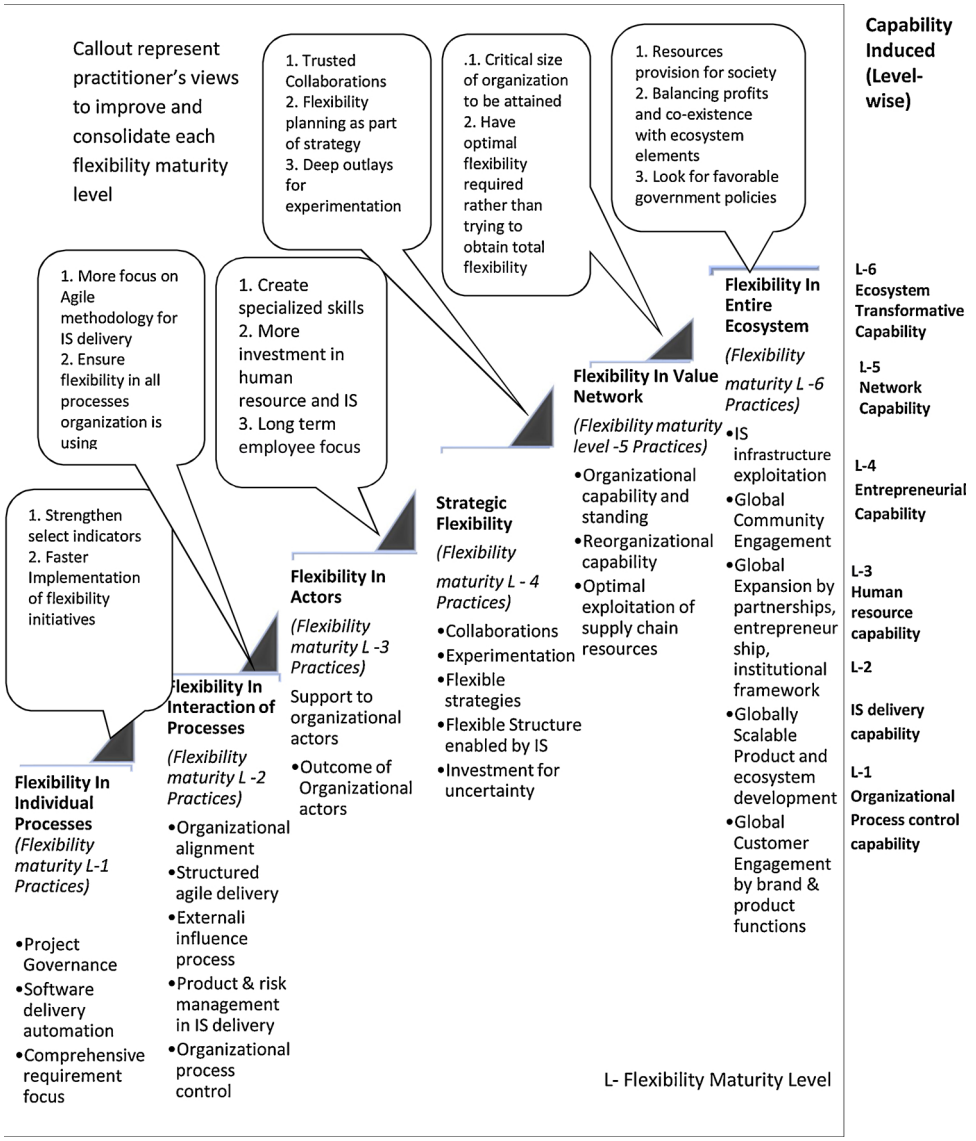

Fig. 1. Flexibility Maturity Levels, Practices, Capabilities, and Guidelines.

eagerness for enhancing actors' flexibility. They noted that indicators are sufficient to explain the actors' flexibility in both small and large organizations. This level of flexibility maturity results in outward expressions such as the exploitation of business opportunities and innovativeness.

The practitioners answered questions related to perceptions of strategic flexibility (fourth maturity level) in light of the indicators of practices. They suggested that enablement of flexibility in actions and decisions result in long-term benefits and prevent delays. The conscious decision to practice strategic flexibility requires deep outlays for experimentation. Practitioners recommended a flexible system structure with sufficient decision-making power at all levels. Few suggested a high cost for targeted flexibility improvements in emergent situations. They also highlighted the precedence of short-term view in IT organizations because the prediction of long-term benefits and features of the software is difficult due to short technology lifecycle. Practicing strategic flexibility is easier for resourceful organizations according to some respondents. Trusted collaborations are also emphasized for strategic flexibility.

The practitioners observed thin differences between fourth and fifth flexibility maturity levels. The resources and critical size of organizations are noted for maintaining the optimal mix of suppliers and partners. At the sixth maturity level, the practitioners emphasized the wide acceptance of an organization's products and services and strong in-house capabilities. This flexibility maturity level is expected in an organization that is a business leader of a segment and has a presence across the world. Leading IT organizations, including M/s Microsoft and Google, are operating at this level according to practitioners. Practitioners also highlighted the importance of full exploitation of opportunities and organizations' resources. Favorable government policy has emerged from interviews as a primary requirement for attaining this flexibility maturity level.

The overall impression from practitioners' viewpoints on practices is of a controlled-flexible, cautious and organization-wide approach to improving flexibility without compromising on-going assignments. Majority among thirty respondents indicated achieving up to third maturity level in the Indian context. As per respondents the investments and benefits are highly favorable up to this level.

5. Synthesis of findings

The behavior of an organization at a given maturity level is the cumulative behavior of the practices that make it up, and the behavior of each practice is the cumulative behavior of the indicators that

comprise the practice. There are twenty-three practices identified among the six flexibility maturity levels. The constructs of flexibility maturity levels, practice areas, and associated indicators have parallel with maturity levels, process areas, and associated work items of the widely prevalent capability maturity model integration (CMMI) framework for developing software products. Practitioners urge that during the evaluation of flexibility maturity levels, the net outcomes of corresponding practices should be verified in the absence of indicators of that practice. The reason may be that in many cases, the organization may not be utilizing the suggested indicators for different practices, but achieving the same result through other means. The prioritization of indicators is not fully agreeable among practitioners. The indicators of higher flexibility maturity levels are the results of long-term systematic efforts. If the expected outcomes of practices of a given maturity level can be visualized, then an organization is said to possess that flexibility maturity level.

The practitioners' viewpoints have primarily emerged as additional guidelines for achieving a flexibility maturity level, which should be addressed to achieve the desired goals envisaged by the corresponding practices. For successful flexibility improvement initiatives, organizations need to strengthen the indicators of various practices. The strengthening of indicators and achievement of goals envisaged by the indicators are both mandatory for compliance with the flexibility maturity level. The worth-to-cost ratio is favorable for accepted indicators of a practice that is built into the responses of questionnaire surveys (Sushil, 2015). The flexibility maturity evaluation using this approach provides long-term benefits and aligns organizational efforts for work productivity. The hierarchy of flexibility maturity levels, along with their associated practices and guidelines suggested by practitioners, is depicted in Fig.1. The cumulative behavior of practices at a maturity level induces a major capability, which is depicted in Fig.1.

6. Discussion

The capability perspective is explored to explain the behavior of practices of maturity levels. The first level practices point to the capability of controlling the process performance through organizational channels. The constituent indicator of first practice at first flexibility maturity level, i.e., adoption of project management is critical to the development of software for cost and time reduction (Sanchez, Terlizzi, & de O. C. de. Moraes, 2017). The use of automation is emphasized in second practice constituted by model-based engineering, test automation, and service orientation in design for speedy development of IS (International Organization for Standardization (ISO), 2010). The third practice relates to comprehensively capture the requirements by considering all possible usage scenarios of software by exercising suitable management control (Capability Maturity Model Integration for Development Version (CMMI-DEV, V1.3, 2010; Paulk, 2002). All three practices together ensure flexibility in the organizational processes and suggest the use of formal engineering and management practices with the focus on automation.

The second level practices enable organizational interactions for software delivery capability through agile methods. The first practice at second maturity level recommends alignment of processes and actors towards goal. The organizational flexibility is institutionalized by alignment, interaction, and reconfiguration of business processes and facilitated by underlying IS infrastructure for service delivery and innovation (Cui, Ye, Teo, & Li, 2015; Gong & Janssen, 2012). The constituent elements of second practice recommend adoption of agile methodology which foresees the close interactions among organizational functions and processes (Livermore, 2008). The third practice recommends openness to the external environment for creating the necessity of interaction among processes and people (Monteiro et al., 2017). The importance of risk management in developing a product with good system functionalities is supported by the fourth practice which foresees strong interaction among stakeholders (Capability Maturity Model Integration for Development Version (CMMI-DEV, V1.3, 2010). The fifth practice "organizational process control" put focus on internal and customer processes for enabling organizational interactions to achieve the strategic goal (Flamholtz, 1996; Nidumolu & Subramani, 2004).

The third level of flexibility maturity enables the human resource capability by providing support to actors and building expectation around them. The first practice of at third maturity level provides support to organizational actors and composed of indicators: exploration and exploitation of opportunities, multi-skilling, the pursuit of new technology and innovations. Wang, Chou, Lee, and Lai (2014)) noted that intra-firm skills offer flexibility to meet varied demand and exploit business opportunities. Further scaling up from multi-skill to multi-domain skill is envisaged for speedy decision making (Costa & Santos, 2017). The second practice Flexible work design aims to create a flexible workforce. The flexible work design impacts the overall organizational flexibility (de Albuquerque & Christ, 2015).

The fourth level of flexibility maturity provides the organizational capability of entrepreneurship by taking uncertainty mitigation measures through flexible strategies. It corresponds to the strategy process. For the practices namely, collaboration and experimentation, Patrakosol and Olson (2007) noted the strong relationship between collaboration and evolutionary innovations for efficient software design. The practice "flexible structure" integrates the flexibility in the decision with strategy as shown by parallel, sequential, convergent, and interwoven decisions (Liew & Sundaram, 2009). The practice "flexible organizational structure" provides the flexibility, responsiveness, and coordination of actors along with rapid development of software (Nerur et al., 2005). The fourth practice envisages investments in real options over and above IS investment for mitigating uncertainty and the best payoff (Campbell, 2002).

The practices at fifth flexibility maturity level provide capability in an organization where network resources are optimally exploited. The first practice envisions capability building through inter- and intra-organizational influences, including offshore and context-based capability development for effective use of the network of suppliers and clients (Jarvenpaa & Mao, 2008; Messerschmidt & Hinz, 2013). The second practice envisages reorganization of product, market, systems, and strategies for the exploitation of resources, improving team dynamics and continuity of business (Lynch et al., 2012; Mann & Marshall, 2007; Nadkarni & Herrmann, 2010; Ravichandran, 2017; Ullah & Lai, 2013). The third practice emphasizes the optimal use of network resources for uncertainty mitigation (Garavelli, 2003).

The organizational capability at sixth maturity level can influence the constituent elements of the ecosystem, policies, and institutions by its resources and influence. This maturity level practices impact the entire ecosystem elements. The first practice at this level visualizes full exploitation of existing IS infrastructure for the supply chain. The second practice finds that community engagement result in innovation, and responsiveness (Krieger & Müller, 2003; Plessis, 2008). The third practice uses institutional frameworks, partnership, and entrepreneurship for innovative services, emerging business, handling the turbulent business environment and extending the reach of business at a global scale (Haile & Altmann, 2016; Helm & Gritsch, 2014; Patel et al., 2015). The fourth practice causes the organization to create flexibility in the product to meet uncertain and varied demand across the globe (Amorim et al., 2014). The fifth practice foresees the creating global brand by offering value to the global customer for creating a flexible business environment and mitigating crises (Al-Kwifi & Ahmed, 2014; Oh et al., 2015).

7. Recommendations

The extensive use of indicators and practices are observed by the organizations for each maturity level that gives the confidence to apply the concept in organizations. The recommended way to enhance

organizational flexibility maturity is through strengthening the activity envisaged in the indicators through commitment, endeavors and deep resource allocations. It is difficult to tightly demarcate the outcomes of flexibility improvement efforts and organizational goal orientation on business performance. Therefore, the approach envisaged in this paper for improving flexibility maturity can be utilized as an alternative strategy for improving organizational performance on a sustainable basis. In other words, the organizational activities identified in the form of indicators are primarily meant for organizational performance but also result in higher flexibility maturity. There will not be any organizational endeavor solely for flexibility enhancement; it is expected to yield good results. The statements covering items/indicators in the questionnaire are designed to leverage this situation. Ebben and Johnson (2005) recommended that for small firms, strategies such as efficiency strategy and flexibility strategy measured separately indicate no significant difference concerning performance. The same is reaffirmed that practices are strategic and provide long-term benefits for organizational performance and concentrate the effort for core and productive work.

7.1. Recommendation and Evidence of use of indicators and practices of flexibility maturity level-1

The first practice relates to the project governance by integrating core processes, knowledge management, project management, and quality process. Strong project management practices result in reducing the risk and cost, remaining competitive during the recession, and winding up projects that may fail. Intel has reduced project duration and improved customer relationships under similar budget restraints by adopting strong project management practices (*The Value of Project Management*, 2010). Apple Inc.'s focus on core competence has resulted in competitive advantage (Heracleous, 2013). The early adoption of flexibility indicator, i.e., knowledge management function by Tata Consultancy Service (TCS) has resulted in reduced attrition costs, reduced cost and time of software projects, and the creation of a future workforce (Sharma et al., 2007). The second practice is software delivery automation made up of indicators, i.e., model-based engineering, use of service-oriented architecture and test automation. These are successfully used for improving productivity by NTT DATA Inc. (Tomiyasu, 2014). The third practice visualizes all scenarios of production, usage, and deployment of IS at the requirement stage for maximum benefits. The comprehensive realization of requirements along with compatibility analysis with underlying hardware has led to the evolution of the next generation of Sony's video gaming as a software product (Sterman, Jekarl, & Reavis, 2011).

7.2. Recommendation and Evidence of use of indicators and practices of flexibility maturity level-2

The organizational alignment induces flexibility for exploring and exploiting the resources. The indicator "harmonized compliance" has provided a technology leadership position to Nanotron Technologies GmbH in the ICT sector due to early adoption (*Economic benefits of standards*, 2014). The other indicators, i.e., targeted flexibility improvement, flexibility audit, and organizational alignment, improve the organizational performance and agility in response to uncertainty (Das & Patel, 2002; Gong & Janssen, 2012; Mason & Mouzas, 2012). Structured agile delivery is an optimal process between structured and unstructured processes for flexibility, efficiency, and controllability that improves the development cycle by adopting software engineering practices and agile methods for software development (Ferreira, Faria, Azevedo, & Marques, 2017). The practice, i.e., external influence focus strives to regularly incorporate the inputs of the external world (customers, business environment, etc.) into internal practices. Benchmarking is an important component of this practice that is successfully utilized by Indian IT company HCL Technologies for faster time to market (*Value Engineering*, 2012). Product and risk management practices enhance the quality of offerings and mitigate the risk. The organizational process control practice monitors the performance of organizational functions while maintaining close customer associations. These practices ensure the interaction of processes and people, resulting in cohesiveness for organizational goals.

7.3. Recommendation and Evidence of use of indicators and practices of flexibility maturity level-3

Third maturity level indicators deal with actors' flexibility, which includes employees, customers, suppliers, partners, characteristics of the workplace and behavioral elements. It has two practices concerned with the support to actors (suppliers, partners, and employees) and expectation from actors. HCL Technologies follows the employee first and customer second policy. It empowers the employees by providing them with the tools they need, access to IS, and flexible work design.

Consequently, it reaps the benefits of the quick decisions at the desired point of time, innovativeness, and the ability to achieve the highest revenue per employee among Indian IT companies (Cappelli, Singh, Singh, & Useem, 2010; Nayar, 2010). The indicators at this flexibility maturity level presume the long-term employee-focused approach. The IS enabled organizational functions help in employee to exploit workplace flexibility.

7.4. Recommendation and Evidence of use of indicators and practices of flexibility maturity level-4

This section identifies the indicators of strategic flexibility, which are primarily related to system structure, investments, and decisions. Two practices are related to collaboration and experimentation in all business spheres. Microsoft collaborated with Toyota for an infotainment segment in a car using multimedia (with voice and maps) and successfully experimented with energy management systems (Turiera & Cros, 2013). Third practice addresses turbulence prediction and mitigation through organizational change, which broadly falls under flexible strategies. Fourth practice addresses flexible structure, which is composed of limited formalism and empowerment. The fourth practice addresses investments for unforeseen circumstances and provides benefits at the time of uncertainty. The strategic roles are facilitated by IS strategy (Ding, Li, & George, 2014).

7.5. Recommendation and Evidence of use of indicators and practices of flexibility maturity level-5

Three practices are identified that are concerned with organizational capability and standing, reorganizational capability and the optimal use of resources in networks. The emergence of IBM Corporation from a software and hardware company to a cognitive and cloud platform organization can be seen in the perspective of its first practice, i.e., organizational capability and standing by strengthening data and analytics capability (*IBM Annual Report*, 2015). The practice of reorganizational capability is strongly associated with overall organizational flexibility. The third practice emphasizes the optimal exploitation of supply chain resources and avoidance of too much spending for creating a buffer for uncertainty. Lee (2004) noted that agility, adaptability, alignment and supply chain efficiency resulted in supply chain performance and increased market share by Dell during the earthquake in Taiwan, yet ignored it resulted in a loss of opportunity for Compaq in the late 1990s when component prices fell. Strategic inventory is achieved at Cisco through an e-hub created for connecting the company and its suppliers for better response (Lee, 2004). Most of the indicators about this maturity level point to the exploitation of IS enabled organizational functions for supporting the strategic processes.

7.6. Recommendation and Evidence of use of indicators and practices of flexibility maturity level-6

The first practice (IS infrastructure exploitation) is successfully utilized by M/s Google for the expansion of business (*Alphabet Inc. & Google Inc.*, 2015). Community engagement and corporate social responsibility (CSR) activities have made a substantial contribution in building the brand image of the Tata group of companies in India (Rangan, Chase, & Karim, 2015). The third practice (Global expansion by partnerships, entrepreneurship, and institutional framework) seeks favorable governmental policies for organizational growth. Microsoft is leveraging global partnership and government institutional support to improve its technology base and enable the governments to provide public services (*The Role of the Private Sector in Expanding Economic Opportunity through Collaborative Action*, 2007). The fourth practice (Global scalable product and ecosystem development) is successfully utilized by Oracle Corporation to emerge ahead of its competitors (Leslie, 2015). The fifth practice (Global customer engagement by brand and product functions) is also successfully adopted by Oracle Corporation by incorporating possible customer expectations in software rather than waiting and finding ways to fit new requirements. This has strengthened the organization's brand as the world's largest database company (Leslie, 2015). These practices are related to the relationships among partner organizations, user community, society, government and stewardship behaviors exhibited by the organization. The optimal balance of profit with expenditures for elements of development ecosystems, society, community, and CSR is required. Intense collaborations and engagement are the main behaviors of organizations at this level.

The adoption of the recommended practices will result in increased levels of control in turbulent environments and help mitigate uncertainty (Volberda, 1997). It is observed that, at lower flexibility maturity levels, the medium to long-term benefits are envisaged and at a higher level overall business value to organizational matters. Volberda (2017) observed that adaptation of an organization and its environment leads to evolution between levels and requires flexibility and creativity, which broadly supports the idea of the current paper to study different levels of flexibility maturity aiming to achieve organizational objectives.

8. Implications of research

There are far-reaching implications of this research for managerial practices. Organizational flexibility has an origin in strategic management theories. The managerial ironies towards flexibility have been addressed using the FMM framework. These are related to practice and grounded in the extant literature.

8.1. Implications for practice

The framework fills the gap of non-availability of literary advice to practicing managers to enhance flexibility. This framework puts the entire stakeholders on a common platform. Therefore, the approach toward the flexibility of higher and lower management is transformed into a common agenda to achieve the goals and capability of different flexibility maturity levels. The strategic and operational aspects of flexibility also converge due to this framework.

This paper treats organizational flexibility in totality as a commonality of purpose towards outcomes at different levels of flexibility maturity in an organization. This work may lead to the establishment of dedicated functions in organizations, which will guide the organizations to attain higher flexibility maturity through the constant evaluation of existing flexibility and take appropriate measures. The comparison of different organizations' flexibility, including mechanisms to improve the organization's flexibility for higher maturity levels, is possible with this approach.

8.2. Contribution to IS theory and literature

This work has added a new maturity model framework. The prevailing maturity models devise the processes that are usually mutually exclusive, but the FMM during its course of evolution has identified key practices encompassing multiple maturity model frameworks. There is an abundance of multiple maturity models, enhancing capability in various organizational functions. The compliance with all of them is not feasible for an organization which generates the debate on process vs. maturity model adoption for effectiveness. This framework covers the essential processes required for sustained performance from other frameworks. The flexibility is desirable to all maturity models and frameworks.

On the other hand, the other maturity models may adopt essential elements of flexibility from FMM and incorporate in their framework. While prevailing maturity models build capability in select areas of operation, the FMM prioritizes key organizational processes for sustained performance. The FMM favors a process and behavior approach in the debate of process vs. maturity model while it is itself a maturity model concept. At the highest level, other maturity models recommend the measurement based optimization, but FMM prefers the select lower level practice and indicators to be more enhanced and made scalable that will drive organizations for global operations. This work has also prepared a base framework on which FMM for other industrial sectors can be built by future researchers.

8.3. Implications for policy

The changing political, economic, social and technological scenario requires the organizational flexibility to be streamlined and institutionalized through political and legal means. The expectations from respective governments are the key indicator in FMM to move ahead for higher flexibility maturity levels, which is necessary as the organizations shape their flexibility within government defined regulation, which in turn has an impact of changing global scenario. The balancing of two opposite propositions is required for higher flexibility, i.e., societal and business goals at the policy level, which allows the organizations to use the indicator at the sixth maturity level related to institutional frameworks.

9. Flexibility, competitiveness and sustained performance

At higher flexibility maturity levels, organizations operate for innovation and cooperate with members even though it is necessary to safeguard one's interest while maintaining a relationship (Dekker, 2003). The ability to forecast long-term customer needs and transformative ecosystem capabilities are required to achieve higher maturity. The practice composition mandates the use of IS to achieve envisaged objective of that practice. The use of IS induces dynamic capability and flexibility (Fink & Neumann, 2009).

The flexibility results in the competitiveness of software firms (Ajitabh, Shee, & Momaya, 2001). According to World Economic Forum (2018), flexibility is a major driver for future readiness and global competitiveness, where India stands at 58th position globally. India is trying to leverage its potential in IT and ITeS sectors to remain competitive under any kind of uncertainty (Deloitte, 2014). There are multiple ways to evaluate tangible behavior of organization created by organization-wide flexibility. In the current research, the benefits created by flexibility foreseeable by executives shortly are considered to identify the flexibility practices. This approach motivates executives to adopt flexibility practices and justify investments. The long term success of Indian software industry competitiveness is seen with uncertainty (Ambastha & Momaya, 2004). Umamaheswari and Momaya (2008) noted that Indian organizations operate at a lower level on the value curve. The mechanism suggested by them, i.e., customer intimacy, requirement comprehensiveness, and creative marketing are

part of indicator set of FMM that caters for a dynamic environment and is a cost-effective approach that gradually institutes flexibility and prepares the organizations for efficient global operations. Achieving the highest maturity level establishes the organization at a leadership position globally that includes export performance.

10. Conclusion

These practices of flexibility maturity are the result of the macro perspective; it will make understanding and implementation of flexibility in organizational settings much easier, resulting in sustained performance. This research provides a fresh perspective of flexibility to managers and scholars working in software development. This paper addresses the problem of flexibility maturity evaluation by adding the practices that correspond to flexibility maturity levels. Organizations should carefully assess their existing maturity level and try to improve select practices or indicators that will improve organizational performance.

The strengthening of lower-level practices results in process performance, and the strengthening of higher maturity level practices results in the creation of a wider impact on society and government. The characteristics of the highest maturity level mandates that the organization should be operating on a global scale. The intense and matured enablers in all spheres, starting with product, process, organization, industry, society, and government, are considered to be at the highest flexibility maturity levels are required for ecosystem performance. This is a base framework for formulating FMM for any industrial sector.

11. Limitations and future work

Other indicators are expected to be added or modified in the future, leading to modifications of practices composition. The identification of inhibitors of flexibility is required to complement this study. Currently, this work is in IT organizations but can be generalized to accommodate others. In the practice product and risk management (maturity level-4), two distinct categories of indicators are aggregated into one factor with the support of two indicators. In future studies, additional indicators are required for splitting them into two distinct factors. Many practices such as Global Customer Engagement by brand product functions, Globally Scalable Product and ecosystem development, Investment for uncertainty, Organizational process control, Product & risk management in software delivery are constituted by two indicators only. The additional indicators are required for proper factor structure. The empirical study of the interrelationship among the practices across maturity levels can help in selectively building the practices in the organization. Practitioners' interviews also highlighted the degree of compliance with a flexibility maturity level, which can be incorporated into future studies. The flexibility and measurable aspects of competitiveness leading to additional flexibility practices corresponding to higher maturity levels can be explored via future research.

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Appendix A1 Indicators, literary references and EFA output

ITEMS(Variables)	Section-1: Factor (Practices) of first flexibility maturity level			
	Project Governance	Software delivery automation	Comprehensive requirement focus	References
Focus on core activities/processes (More focus on code / design elements and less on documentation)	***.739***	.044	.013	Germain & Robillard, 2005; Paulk, 2002
Project management practices and tools	***.708***	.086	.073	Wells, 2012
Knowledge management function	***.612***	.336	.118	Chan & Thong, 2009
Quality focused approach	***.533***	.062	.241	International Organization for Standardization (ISO), 2008
Use of service oriented architecture	.114	***.756***	.101	Gulledge & Deller, 2009
Model based engineering	.155	***.590***	.017	International Organization for Standardization (ISO), 2010
Test automation	.081	***.709***	.189	International Organization for Standardization (ISO), 2010
Comprehensive requirements focus	.222	-.029	***.730***	International Organization for Standardization (ISO), 2008
Exercising management control on requirement collection process	.260	-.007	***.657***	Maruping et al., 2009; Nidumolu & Subramani, 2004
All production and usage scenario	-.160	.371	***.575***	Chastek et al., 2009
Automated deployment	.045	.235	***.551***	International Organization for Standardization (ISO), 2010
Multiple actors involvement in requirement process ***	-	-	-	Paulk, 2002
Multiple formats of requirement collection (Structured Unstructured, interview, questionnaire, observations) ***	-	-	-	International Organization for Standardization (ISO), 2008
Multiple mode of requirement collection (Tool assisted /manual) ***	-	-	-	International Organization for Standardization (ISO), 2008, 2010
Focus on completeness of requirements ***	-	-	-	International Organization for Standardization (ISO), 2008
Focus for unambiguous requirements ***	-	-	-	Capability Maturity Model Integration for Development Version (CMMI-DEV, V1.3, 2010 International Organization for Standardization (ISO), 2008,
First time right design approach ***	-	-	-	Tseng & Lin, 2011
Use of publish/ subscribe methodology ***	-	-	-	Murguzur et al., 2014
Object reuse practice ***	-	-	-	Murguzur et al., 2014
Granular design approach ***	-	-	-	Subramanyam et al., 2012
Cumulative variance (%)	17.220	33.063	48.710	

Items(Variables)	Section 2: Factor(Practices) of second flexibility maturity level					
	Organizational alignment	Structured agile delivery	External influence focus	Product & risk management in IS delivery	Organizational process control	References
Harmonized compliance (Adaptations to multiple rules and standards, certifications)	***.524***	.153	.048	.249	.061	Gong & Janssen, 2012; Hughes et al., 2017
Targeted flexibility improvement initiatives (workplace, business process, models, resources)	***.680***	.439	-.172	-.088	.142	Gong & Janssen, 2012; Mason & Mouzas, 2012
Alignment of organizational actors	***.758***	-.099	.267	.034	.163	Faraj & Sproull, 2000
Flexibility audit of products and processes (and consequent redesign)	***.636***	.148	.408	.083	-.107	Das & Patel, 2002;
Usage of software engineering techniques	.127	***.591***	.182	.024	-.025	Chow & Cao, 2008
Use of agile methodology	.010	***.749***	.141	.110	-.016	Paulk, 2002
Rapid prototyping approach	.158	***.754***	.060	.062	.199	Paulk, 2002
Decision and execution under external influence	.279	.025	***.690***	-.015	.018	Monteiro et al., 2017
Benchmarking of products and processes	.170	.114	***.665***	.107	.061	Partovi, 1994
Integration of product components from internal& external sources	-.123	.285	***.735***	.047	.113	Capability Maturity Model Integration for Development Version (CMMI-DEV, V1.3, 2010
System functions focus	.056	-.017	.080	***.864***	.159	Lin & Wang, 2011
Risk management and risk pooling	.133	.182	.046	***.853***	.061	International Organization for Standardization (ISO), 2008; Mathew & Chen, 2013
Organizational control (at people and processes level)	.076	.035	.038	.200	***.787***	Volberda, 1997; Wang et al., 2008;
Customer involvement in life cycle phases	.087	.085	.098	.019	***.837***	Chow & Cao, 2008; Paulk, 2002
Cumulative Variance	13.669	26.977	39.861	51.456	61.946	

Items(Variables)	Section 3: Factor(Practices) of third flexibility maturity level		
	Outcome of organizational actors	Support to organizational actors.	References
Simultaneous exploration and exploitation of opportunities	***.667***	.290	Lin & Ho, 2016
Multi skilling and concurrent execution of work	***.896***	.164	Iravani et al., 2005
Innovativeness	***.527***	.188	Martínez-Sánchez et al., 2011
Technology exploration	***.869***	.140	Javier et al., 2014
Information across all stakeholders(Web enabled easier access for inside and outside actors)	.069	***.821***	Bajgoric, 2000;
Ensure Supplier responsiveness	.193	***.788***	Narasimhan et al., 2004
Provision for short leaves	.249	***.641***	Haley & Miller, 2015
Flexible work design enabled by IS	.375	***.595***	Hoeven & Zoonen, 2015; Naranjo-Gil, 2009
Coping and explanation to anxious employees ***	-	-	Fresco et al., 2006
Cumulative variance(%)	31.542	59.358	

Items(variables)	Section 4: Factor(practices) of fourth flexibility maturity level				
	Collaborations and experimentation	Flexible strategies (In Decision and Execution)	Flexible Structure enabled by IS	Investment for uncertainty	References
IS enabled unified communication in organization	***.722***	.170	.294	.103	Steinbring et al., 2013
Synthesis of different processes & strategies (people & organizational)	***.579***	.325	-.087	.166	Sushil, 2012a
Value adding partnership and collaborative decision	***.650***	.398	.086	.151	Lin et al., 2006; Narasimhan et al., 2004
Investments in new product, new market, experimentation and renewal process	***.644***	.120	.209	-.243	Volberda, 1997
R&D activities and associated investments	***.615***	.378	.120	-.044	Santiago & Vakili, 2005
Establishing new production sites/ centers / offices	***.520***	.295	.114	.291	Fisch & Zschoche, 2012
Focus on cost effectiveness	***.595***	-.091	.162	.176	Ganguly et al., 2009
Flexible organizational strategies	.230	***.515***	.239	-.113	Sushil, 2012b
Readiness for change (Proactively or reactively)	.319	***.617***	.263	.046	Sheffield and Lemétayer (2012);
Usage of data warehousing and data mining (for prediction of market turbulence)	.029	***.776***	-.069	.212	Lee & Siau, 2001; Seng & Chen, 2010
Timely and comprehensive decision process (decisions are exhaustive and inclusive) concerns	.253	***.598***	.203	.165	Atuahene-Gima & Li, 2004; Hughes et al., 2016; Misra et al., 2009
	.201	.258	***.712***	.215	Goldstein et al., 2010

Middle and ground management for projects execution					
Limited formalization &flexible structure(structure and environment matches)	.075	.359	***.717***	-.066	Iravani et al., 2005; Nerur et al., 2005;
Multidimensional empowerment of employees	.247	-.098	***.693***	.086	McEwan & Sackett, 2001
Investments in real options	.377	.107	-.035	***.769***	Brouthers & Dikova, 2010
FDI and exports related innovations	-.118	.171	.436	***.669***	Lee & Makhija, 2009
Cumulative variance(%)	19.864	34.851	47.741	56.631	

Items(Variables)	Serction 5: Factor(Practices) of fifth flexibility maturity level			
	Organizational capability and standing	Reorganizational capability	Optimal exploitation of supply chain resources	References
Technological capability creation	***.759***	.178	-.108	Tzokas et al., 2015
Improve relative standing of the organization	***.710***	-.004	.171	Adams & Balfour, 2010;
Focus to increase corporation size	***.698***	.050	.210	Livermore, 2008
Resource and competency sharing	***.603***	.240	.345	Yusuf et al., 2004
Team reorganization	.012	***.784***	.034	Mann & Marshall, 2007
IS and business alignment	.116	***.813***	-.082	Ravichandran, 2017; Ullah & Lai, 2013
Market re-orientation	.158	***.524***	.240	Lynch et al., 2012
Strategy recalibration, refocus, reorganization of resources	.090	***.566***	.357	Nadkarni & Herrmann, 2010
Flexible Contracts with suppliers	.336	.245	***.569***	Li & Kouvelis, 1999
Optimal configuration of supply chain elements and multiple mode of supply	.303	-.001	***.565***	Garavelli, 2003
Strategic inventory	-.050	.112	***.854***	Christopher, 2000
Trust based transactions***	-	-	-	Lin et al., 2006; Song & Yu, 2009
Cumulative variance(%)	19.863	38.358	54.444	

Items(Variables)	Section 6: Factor(Practices) of sixth flexibility maturity level					
	IS infrastructure exploitation	Global Community Engagement	Global Expansion by partnerships, entrepreneurship, institutional framework.	Globally Scalable Product and ecosystem development	Global Customer Engagement by brand & product functions	References
Full exploitation of IS	***.610***	.064	.398	.003	.262	Swafford et al., 2008
Enterprise-wide supply chain integration using IS	***.670***	-.005	.029	.142	.172	Swafford et al., 2008; Chen et al., 2010
IS enabled relationship among ecosystem elements	***.690***	.399	.094	.185	-.106	Ngai et al., 2011; Saraf et al., 2007.
Usage of e-platforms and e-services/ online/internet for demand generation/marketing	***.776***	-.004	-.066	.105	.054	Dwivedi et al., 2017; Fauska et al., 2014, Rust & Kannan, 2003 Rust & Kannan, 2003
Utilization of comprehensive feedback process	.362	***.585***	-.002	-.371	.147	Meyer et al., 2014
Heterogeneous community building and utilization(for product / innovation/ Knowledge)	-.108	***.789***	.100	.352	-.003	Krieger & Müller, 2003; Zhao et al., 2012
Engagement of society, environment and CSR activities.	.128	***.767***	.175	-.019	.247	Yin & Jamali, 2016
Entrepreneurship and stewardship orientation (at national & international levels)	.117	-.077	***.713***	-.020	.357	Helm & Gritsch, 2014; Patel et al., 2015;
Utilization of institutional framework (government policy and location advantage).	-.013	.155	***.846***	-.005	-.004	Elg et al., 2015
Sharing economy among partners enabled by IS	.057	.309	***.597***	.358	-.104	Haile & Altmann, 2016; Sutherland & Jarrahi, 2018
Incorporate derived flexibility requirements	.173	-.011	.191	***.675***	.111	Stephenson & McDermid, 2005
Investment for flexible ecosystem (APIs, technical platform, business partners and adaptive features in product)	.172	.121	-.091	***.715***	.163	Amorim et al., 2014;
Value beyond functional requirement	.082	.076	.124	.100	***.887***	Fauska et al., 2014; Oh et al., 2015;
Global resources &brand building	.223	.298	.044	.244	***.566***	Al-Kwifi & Ahmed, 2014
Selective Feedback (Formal / Management reviews)***	-	-	-	-	-	International Organization for Standardization (ISO), 2008; Wang et al., 2008
Cumulative Variance	15.656	29.596	42.854	53.505	64.070	

1. The italics and bold values represent factor loading
2. *** Dropped items, excluded from further analysis

Appendix B2 CFA model and model fit indices

Section 1: Confirmatory factor analysis results and fit indices for first maturity level (number of samples n = 150)

Factor loadings corresponding to practices and model			Reliability and validity		common-method bias	Discriminant validity matrix			
ITEMS(Variables)	Factor (Practices)	Loading	AVE	CR	Single factor loading		Factor-1	Factor-2	Factor-3
Focus on core activities/processes	Project Governance	0.671	0.492	0.794	40%	Factor-1	0.701	-	-
Project management practices and tools	(Factor-1)	0.636			Cumulative variance in single factor for Harman;s single factor test				
Knowledge management function		0.743							
Quality focused approach		0.748							
Use of service oriented architecture	Software delivery automation (Factor-2)	0.778	0.584	0.828		Factor-2	0.39	0.764	-
Model based engineering		0.862							
Test automation		0.636							
Comprehensive requirements focus	Comprehensive requirement focus (Factor-3)	0.694	0.547	0.806		Factor-3	0.52	0.58	0.740
Exercising management control on requirement collection process		0.771							
All production and usage scenario		0.703							
Automated deployment		0.787							
Model Fit indices									
CMIN/DF0.617, P-value0.974, RMSEA 0.000, GFI 0.970, AGFI 0.952, CFI 1.000, TLI 1.037, NFI 0.960, SRMR 0.0341									

Section 2: Confirmatory factor analysis results and fit indices for second maturity level (number of samples n = 150)

Factor loadings corresponding to practices and model			Reliability and validity		common-method bias	Discriminant validity matrix					
ITEMS(Variables)	Factor (Practices)	Loading	AVE	CR	Single factor loading		Factor-1	Factor-2	Factor-3	Factor-4	Factor-5
Harmonized compliance	Organizational alignment (Factor-1)	0.754	0.679	0.894	31.472	Factor-1	0.824	-	-	-	-
Targeted flexibility improvement initiatives (workplace, business process, models, resources)		0.809			Cumulative variance in single factor for Harman;s single factor test						
Alignment of organizational actors		0.866									
Flexibility audit of products and processes		0.862									
Usage of software engineering techniques	Structured agile delivery (Factor-2)	0.707	0.657	0.851		Factor-2	0.413	0.810	-	-	-
Use of agile methodology		0.864									
Rapid prototyping approach		0.852									
Decision and execution under external influence	External influence focus (Factor-3)	0.741	0.666	0.856		Factor-3	0.243	0.194	0.925	-	-
Benchmarking of products and processes		0.903									
Integration of product components from internal & external sources		0.795									
System functions focus	Product & risk management in software delivery (Factor-4)	0.908	0.760	0.863		Factor-4	0.399	0.274	0.214	0.871	-
Risk management and risk pooling		0.834									
Organizational control	Organizational process control (Factor-5)	0.726	0.586	0.740		Factor-5	0.17	0.149	0.015	0.318	0.767
Customer involvement in life cycle phases		0.805									
Model Fit indices											
CMIN /DF 1.43, P-value 0.91, RMSEA .031, AGFI 0.900, CFI 0.989, TLI 0.989, GFI 0.931, NFI 0.918, SRMR 0.0447											

Section 3: Confirmatory factor analysis results and fit indices for third maturity level (number of samples, n = 150)

Factor loadings corresponding to practices and model			Reliability and validity		common-method bias	Discriminant validity matrix			
ITEMS(Variables)	Factor (Practices)	Loading	AVE	CR	Single factor loading		Factor-1	Factor-2	
Simultaneous exploration and exploitation of opportunities	Outcome of organizational actors (Factor-1)	0.742	0.644	0.876	39.784	Factor-1	0.803	-	
Multi skilling and concurrent execution of work		0.943			Cumulative variance in single factor for Harman;s single factor test				
Innovativeness		0.612							
Technology exploration		0.873							
Information across all stakeholders	Support to organizational actors (Factor-2)	0.861	0.684	0.896		Factor-2	0.090	0.827	
Ensure Supplier responsiveness		0.911							
Provision for short leaves		0.762							
Flexible work design enabled by IS		0.763							
Model Fit indices									
CMIN/DF1.295, P-value0.165, RMSEA 0.044, GFI 0.959, NFI 0.962, SRMR 0.034, AGFI 0.929, TLI 0.988,CFI 0.991									

Section 4: Confirmatory factor analysis results and fit indices for fourth maturity level (number of samples, n = 150)

Factor loadings corresponding to practices and model			Reliability and validity		common-method bias	Discriminant validity matrix					
ITEMS (Variables)	Factor (Practices)	Loading	AVE	CR	Single factor loading		Factor-1	Factor-2	Factor-3	Factor-4	Factor-5
IS enabled unified communication in organization	Collaborations (Factor-1)	0.824	0.672	0.861	33.415	Factor-1	0.820				
Synthesis of different processes & strategies (people & organizational)		0.822			Cumulative variance in single factor for Harman;s single factor test						
Value adding partnership and collaborative decision		0.815									
Investments in new product, new market, experimentation and renewal process	Experimentation (Factor-2)	0.713	0.436	0.755		Factor-2	0.619	0.660			
R&D activities and associated investments		0.642									
Establishing new production sites/ centers / offices		0.632									
Focus on cost effectiveness		0.65									
Flexible organizational strategies	Flexible strategies (Factor-3)	0.818	0.620	0.866		Factor-3	0.325	0.333	0.787		
Readiness for change		0.832									
Usage of data warehousing and data mining		0.793									
Timely and comprehensive decision process		0.699									
Middle and ground management for projects execution	Flexible Structure (Factor-4)	0.881	0.736	0.893		Factor-4	0.371	0.476	0.219	0.858	
Limited formalization &flexible structure		0.866									
Multidimensional empowerment of employees		0.825									
Investments in real options	Investment for uncertainty (Factor-5)	0.879	0.746	0.854		Factor-5	0.405	0.316	0.295	0.458	0.864
FDI and exports related innovations		0.848									
Model Fit indices											
CMIN /DF 1.108, P-value 0.211, RMSEA 0.027, AGFI 0.883, CFI 0.990, TLI 0.988, GFI 0.910, NFI 0.906, SRMR 0.513											

Section 5: Confirmatory factor analysis and fit indices for fifth maturity level Factor loadings corresponding to practices and model			Reliability and validity		common-method bias	Discriminant validity matrix			
ITEMS(Variables)	Factor (Practices)	Loading	AVE	CR	Single factor loading		Factor-1	Factor-2	Factor-3
Technological capability creation	Organizational capability and standing (Factor-1)	0.79	0.671	0.891	40.547	Factor-1	0.819		
Improve relative standing of the organization		0.838			Cumulative variance in single factor for Harman;s single factor test				
Focus to increase corporation size		0.841							
Resource and competency sharing		0.79							

Team reorganization	Reorganizational capability	0.795	0.644	0.878		0.282	0.802	
IS and business alignment	(Factor-2)	0.892						
Market re-orientation		0.739						
Strategy recalibration, refocus, reorganization of resources		0.776						
Flexible Contracts with suppliers	Optimal exploitation of supply	0.873	0.675	0.861		0.369	0.409	0.822
Optimal configuration of supply chain elements and multiple mode of supply	chain resources (Factor-3)	0.809						
Strategic inventory		0.78						
Model Fit indices								
CMIN /DF 1.109, P-value0.292, RMSEA 0.028, AGFI 0.915, CFI 0.995, TLI 0.993, GFI 0.947, NFI 0.948, SRMR 0.310								

Section 6: Confirmatory factor analysis results and fit indices for sixth maturity level (number of samples, n = 150)

Factor loadings corresponding to practices and model			Reliability and validity		common-method bias	Discriminant validity matrix					
ITEMS(Variables)	Factor (Practices)	Loading	AVE	CR	Single factor loading		Factor-1	Factor-2	Factor-3	Factor-4	Factor-5
Full exploitation of IS	IS infrastructure exploitation (Factor-1)	0.738	0.619	0.867	36.765	Factor-1	0.787	-	-	-	-
Enterprise-wide supply chain integration using IS		0.788			Cumulative variance in single factor for Harman;s single factor test						
IS enabled relationship among ecosystem elements		0.839									
Usage of e-platforms and e-services/ online/internet for demand generation/marketing		0.78									
Utilization of comprehensive feedback process	Global Community Engagement (Factor-2)	0.759				Factor-2	0.371	0.824	-	-	-
Heterogeneous community building and utilization		0.869									
Engagement of society, environment and CSR activities		0.839									
Entrepreneurship and stewardship orientation	Global Expansion by partnerships entrepreneurship	0.789				Factor-3	0.478	0.334	0.814	-	-
Utilization of institutional framework	(Factor-3)	0.857									
Sharing economy among partners enabled by IS		0.794									
Incorporate derived flexibility requirements	Globally Scalable Product and ecosystem development (Factor-4)	0.791				Factor-4	0.423	0.394	0.406	0.807	-
Investment for flexible ecosystem		0.823									
Value beyond functional requirement	Global Customer Engagement by brand product functions (Factor-5)	0.784				Factor-5	0.301	0.439	0.446	0.347	0.864
Global resources &brand building		0.844									
Model Fit indices											
CMIN /DF 1.227, P-value 0.087, RMSEA 0.039, GFI 0.928, AGFI 0.894, CFI 0.982, TLI 0.979, NFI 0.912, SRMR 0.443											

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