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The consequences of innovation failure: An innovation capabilities and dynamic capabilities perspective

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ABSTRACT

Organizations engage with innovation by leveraging their innovation capabilities and dynamic capabilities. In this study, we examined how organizational innovation capabilities and dynamic capabilities can influence organizational performance, taking into account cases when innovation projects do not yield beneficial outcomes to organizations. Building on the dynamic capability view and the notion of innovation capability, we developed a conceptual model and subsequently validated it by conducting a survey on a sample of organizations across multiple manufacturing and service industries that are based in India. By applying PLS-SEM, we found that different contextual factors including commercial viability and technological feasibility play a critical role towards innovation failure and success. In its turn, innovation failure negatively influences organizational performance.

1. Introduction

Innovation is one of the key sources of organizational success and growth, and a critical component to gain a competitive advantage in a volatile and turbulent marketplace (Gök and Peker, 2017; Kraśnicka et al., 2018) as suggested also by industry and academic research (Shelton and Percival, 2013; Chatterjee et al., 2021). However, innovation activities and processes cannot always lead to the desired outcomes and organizations trying to innovate face multiple challenges translating into innovation failure (Forsman, 2021). For instance, in a recent study, 40–90% of innovation projects eventually ended up in a complete failure or a partial failure (Perin et al., 2017), depending on the nature of innovation (Rhaiem and Amara, 2021a, b). Interestingly, though the failure rate of innovation is so high, still many innovation management studies tend to focus on the success of innovation rather than on innovation failure (Mueller and Shepherd, 2016; García-Quevedo et al., 2018). Therefore, not only studies about innovation failure are scarce (Maslach, 2016), but a discussion of how innovation failure can be appropriately defined, conceptualized and operationalized is not developed in depth (Vinck, 2017; Hartley and Knell, 2022). Some researchers have also argued that innovation failure should not be seen as a negative phenomenon, as it can also generate opportunities. For instance, some scholars argue that "while exploration is likely to increase firm's exposure to failure, it might also provide learning opportunities to reduce failure" (D'Este et al., 2018, p.525). Indeed, failing allows organizations to learn and learning can induce them to discontinue or prune some innovation projects or to pivot them and modify the underlying innovative ideas (Qin and van der Rhee, 2021; Hartley and Knell, 2022).

To effectively innovate, organizations need to appropriately leverage resources that are valuable, rare, inimitable, and non-substitutable (VRIN), in line with the tenets of the resource-based view (RBV) (Barney, 1991). However, there are some organizations that are better than others to manage innovation and demonstrate a superior record of successfully exploiting new ideas (Francis and Bessant, 2005). These organizations "can be said to possess, at least for a period of time, a superior 'innovation capability'. Developing such capability is an important strategic issue since innovation plays a key role in survival and growth of enterprises" (Francis and Bessant, 2005: p. 171).

However, "some innovation initiatives have proved to be

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dysfunctional, occasionally leading to catastrophic losses" (Francis and Bessant, 2005, p.171) and therefore an innovation capability is critical as it allows to make strategic assessments on innovation initiatives. Accordingly, when organizations face volatile and turbulent economic environments, they certainly need dynamic capabilities (Teece and Pisano, 1994; Teece et al., 1997) allowing them to sense opportunities that can be seized and reconfigured through innovation initiatives and with the help of resources. However, they will also need an innovation capability (Francis and Bessant, 2005) that allows them to strategically evaluate their own innovation initiatives and assess prior and current innovation successes and failures. Extant literature has not yet assessed if and to what extent organizational capabilities (namely innovation capabilities) can drive innovation failures and success and how they influence, in their turn, organizational performance. Consistently, this work sets out to address the following research question (RQ): *How and to what extent do organizational innovation capabilities influence innovation failure and organizational performance?*

The above RQ has been addressed by developing and testing a holistic theory-driven integrated conceptual model entailing organizational innovation capabilities, innovation failure and organizational performance. The conceptual model, that relies on the resource-based view (RBV) (Barney, 1991) and dynamic capability view (DCV) (Teece et al., 1997), was tested on a sample of 314 respondents, using a factor-based PLS-SEM technique.

As such, this study makes several key contributions. First, it identifies and operationalizes key drivers of innovation failure/success by identifying commercial viability and technological feasibility as critical factors. Second, it suggests that organization innovation capabilities, by acting on commercial viability and technological feasibility have the capability to influence innovation failure. Third, it suggests that a combination of innovation failure and success can influence organizational performance.

To achieve its aims, the paper is structured as follows: in the second section we review the relevant literature. In section 3, we develop our hypotheses based on the chosen theoretical foundations (the dynamic capabilities view and the concept of innovation capability). Section 4 illustrates the research methods. Section 5 portrays the analysis and results. The sixth section includes a discussion as well as an illustration of the theoretical contributions and managerial implications stemming from this study, as well as a description of the limitations and future research avenues.

2. Literature review

2.1. Innovation and innovation failure

Innovative activities are an important pillar for the development, growth, and success of organizations (Leoncini, 2016) and entire industries and national economies (Baumol, 2002). For instance, William Baumol suggested that "virtually all of the economic growth that has occurred since the 18th century is ultimately attributable to innovation" (Baumol, 2002: p. 36).

However, while undertaking innovative initiatives, organizations might incur also in innovation failures that are well documented in the literature (Forsman, 2021). Innovation failure is not necessarily a negative phenomenon as "within some failures lie the seeds of subsequent project success" (Shepherd, 2009, p.589). Indeed, failure can also bring about learning opportunities that allow to identify mistakes and avoid them in subsequent innovation initiatives and projects. This can also lead to change organizational strategies, policies, and goals of the organization to eventually improve performance (Argyris and Schon, 1978; Mariani and Nambisan, 2021; Nguyen, 2021; Hartley and Knell, 2022; Vrontis et al., 2021). On the other hand, innovation failure is a negative phenomenon when organizations do not even learn from failures (Cannon and Edmondson, 2005; Forsman, 2021). This is the worst possible scenario as organizations fail twice: in their innovation initiatives and in their (potential) learning from their failure.

Innovation management scholars have shown that learning from success and failure should be considered as two different processes, and failure is considered more beneficial than success since organizations learn more from failure than success (Baumard and Starbuck, 2005). However, learning is not sufficient per se if an organization is not endowed with adequate resources and capabilities.

2.2. Innovation, the resource-based view (RBV), the dynamic capability view (DCV) and innovation capabilities

Thirty years ago, by blending scholarly work in neo-classical economics, evolutionary economics, and firm resource heterogeneity, and embracing the structure-conduct-performance (SCP) framework, Jay Barney (1991) shaped the foundations of the resource based view (RBV) theory of the firm. This theoretical framework illustrates how organizations' value and profit are generated by focusing on organizational resources that consist of "all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. Controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness" (Barney, 1991, p. 101). To create value and profits, organizations must have access to resources that are a) *valuable*; b) *rare*; c) *inimitable* or, more realistically, non-perfectly imitable by competitors; and d) non-substitutable. These resources – whose aforementioned features are acronymized as VRIN - are critical to support and enable innovation initiatives, practices, and projects.

However, the RBV is perceived to have ignored the dynamics of capabilities creation and has shed not much light on the kind of capabilities that organizations need to develop to gain competitiveness (Pisano, 2015). This limitation has been addressed by the DCV (Nieves et al., 2015). Indeed, dynamic capabilities (and the related DCV) can be interpreted as a "high-level routine (or collection of routines) that, together with its implementing input flows, confers upon an organization's management a set of decision options for producing significant outputs of a particular type" (Winter, 2003, p. 991).

Often resources are not enough per se, as they need to be orchestrated by organizational capabilities that are organizational abilities to combine, assemble, integrate, and exploit resources to achieve a competitive advantage (Eisenhardt and Martin, 2000; Teece et al., 1997). Organizational capabilities belong to a wider set of organizational competitive capabilities defined as organizational capacity to deploy and combine resources, through organizational processes, to achieve a desired end. These capabilities have been characterized as dynamic if they can adapt promptly to fast-paced, highly turbulent, and dynamic business environments, and if they enable to adapt, integrate, and re-configure resources (Teece and Pisano, 1994). Within the Dynamic Capabilities (DC) theory, dynamic capabilities allow organizations to sense, seize, and reconfigure opportunities through innovation initiatives.

However, there are some organizations that are better than others in dealing with VRIN resources supporting innovation because they have the capabilities to manage innovation better than their counterparts and thus demonstrate a superior record of successfully exploiting new ideas (Francis and Bessant, 2005). These organizations "can be said to possess, at least for a period, a superior 'innovation capability'. Developing such capability is an important strategic issue since innovation plays a key role in survival and growth of enterprises" (Francis and Bessant, 2005: p. 171). Innovation capabilities are particularly important as they can influence the feasibility and technological and commercial viability of innovative projects that could in their turn influence the success or failure of innovation (Bhattacharjee et al., 2021; D'Este et al., 2018; Khanna et al., 2016).

Taken together, the combination of the DCV theoretical perspective (Teece and Pisano, 1994; Teece et al., 1997) and the theorization of innovation capabilities (Francis and Bessant, 2005), suggest that investment in resources for innovation is not necessarily conducive to successful innovation. Rather, they seem to suggest that resources might need to be combined by means of dynamic and innovation capabilities to generate innovative outcomes. However, we do not know if and to what extent innovation capabilities can actually help organizations leverage innovation failures to improve organizational performance and also the extent to which innovation successes and failures can influence differently organizational performance. This work tries to bridge this research gap by developing and testing a conceptual model that builds on the DCV theoretical perspective (Teece et al., 1997; Teece and Pisano, 1994) and the concept of innovation capability (Francis and Bessant, 2005) to understand if and how innovation failures, potentially through learning from innovation failure (Storey et al., 2016), influence organizational performance.

3. Hypotheses development

3.1. Innovation capabilities

Innovation is widely recognized as one of the most critical factors to improve and sustain organizational performance (Baumol, 2002). Innovative organizations grow faster in terms of profitability and employment (Kleinknecht et al., 1997; Mariani et al., 2022; Vu & Nwachukwu, 2021). However, the feasibility of any innovation initiative or project depends on many factors such as technological and manufacturing resources and commercial viability (Madique and Zirger, 1984; Sheshadri, 2020; Baloch et al., 2022). Consistently with the Resource Based View (RBV) (Barney, 1991), these resources may be considered as valuable, rare, inimitable, and non-substitutable (VRIN) resources that can potentially lead to enhanced innovation and organizational performance. There are several benefits stemming from organizational innovation capabilities (Francis and Bessant, 2005) that include: mitigation of risk, reduction of product development cost, acceleration of the lead time to market, improvement of know-how, access to new markets, leveraging of technology (Helm et al., 2019; Binci et al., 2020; Chaudhuri & Vrontis, 2021). Moreover, innovative capabilities help trigger individual-based improvement opportunities by enhancing individual skills and knowledge that can translate into higher competence and enhanced human capital (Bogers, 2011; Sheshadri, 2019; Locatelli et al., 2021). Innovative capabilities at the organizational level are related therefore to technological feasibility and commercial viability and can influence organizational performance. Accordingly, we hypothesize what follows:

H1a. Organization innovation capability (OIC) and commercial viability (COV) of a newly developed product are positively correlated.

H1b. Organization innovation capability (OIC) positively influences organizational performance (ORP).

H1c. Organization innovation capability (OIC) and technological feasibility (TEF) to develop a new product are positively corelated.

3.2. Commercial viability

Innovation activities including new product concept and development, as well as testing and marketing, help managers understand the commercial viability of a new products (Wilkinson, 2018). Commercial viability depends on product related factors as well as market-oriented factors (Wong and Zeng, 2015). More specifically, commercial viability depends on factors such as the relative price of products, their quality, convenience of usage, standard of after sales service, total cost of use, and backward compatibility (Midique and Zirger, 1984; Wei Phang et al., 2014; Sharma et al., 2021). Early market introduction of a product is considered as a competitive advantage (Hopkins, 1981; Kim & Hoskisson, 2015). Indeed, in consonance with the DCV (Teece et al., 1997), the introduction in the market of a product at an early stage entails organizational capabilities directed to assess the market potential in a dynamic and fast changing marketplace, thus effectively supporting strategies of product introduction and launch.

A study has observed that delay in introducing a product in a market by six to twelve months is found to have reduced financial return by 50% (Johne and Snelson, 1988). Several studies have demonstrated that to enhance the commercial viability of innovation projects, organizations must invest adequately in resources (Bogers, 2011; Aziz and Samad, 2016). Such investment in resources can improve organizational innovation capabilities. On the contrary, lack of investment on resources and capabilities supporting innovation might lead to disastrous consequences (García-Quevedo et al., 2018; Forsman, 2021). Thus, to achieve a high success rate in innovation projects, organizations are likely to put their effort into adequately planning for each innovation project.

This discussion leads to the observation that an improvement in the commercial viability of a product brings about innovation success, whereas a decline in commercial viability generates innovation failure. Accordingly, we formulate the following hypotheses:

H2a. Strong commercial viability (COV) of a product is positively correlated with the success of the innovations (SUI) developed by the organization.

H2b. Weak commercial viability (COV) of a product is positively correlated with the failure of the innovations (FAI) developed by the organization.

3.3. Technological feasibility

The technological feasibility of an innovative project depends mainly on four factors: organizational culture; experience with the innovation; efforts in R&D; and strategy of the organization towards innovation (van der Panne et al., 2003). First, an organizational culture supporting innovation helps acknowledge the necessity of innovating and as such, it is related with the technical feasibility of innovation projects (Lester, 1998; Keegan & Turner, 2002). Resistance to innovation emerging from a myopic organizational culture brings to innovation failure. Second, experience with innovation is important: early engagement with different stakeholders in innovative projects enhances organizational technological abilities and allows to draw on previous experience (Bessant, 1993; Laschi et al., 2016). Consistently with the RBV (Barney, 1991), technological abilities represent in-house VRIN resources and capabilities that can eventually influence the overall organizational performance. Third, often experience is achieved through appropriate investment and efforts in R&D such as investing in an established R&D team (van der Panne et al., 2003; Laschi et al., 2016) whose strength could be interdisciplinarity (Roure and Keeley, 1990). Last, effective strategies enhancing innovation can lead to technological feasibility (Keegan & Turner, 2002). Strategically, organizations need to develop innovation initiatives by targeting the proper markets and by deploying technologies already used in previous experience. This leads us to develop the following hypotheses:

H3a. Strong technological feasibility (TEF) of a product is positively correlated with the success of innovations (SUI) developed by the organization.

H3b. Weak technological feasibility (TEF) of a product is positively correlated with the failure of innovations (FAI) developed by the organization.

3.4. Organizational performance

Innovation performance typically influences organizational performance. Organizations that invest more in innovation initiatives and activities are seen to grow faster (Cohen, 2010). Still, many organizations are found to be reluctant to invest in innovative activities (Archibugi et al., 1991) and this can be due to the high rate of innovation failures. Several studies have examined commercial viability and technological feasibility as the critical attributes of the success and failure of innovation initiatives and projects (Hopkins, 1981; Bessant, 1993; Rhaiem and Amara, 2021a, b). We have already discussed how commercial viability and technological feasibility can lead to innovation success or failure. If product quality and price are balanced and fair, the product is most likely to be commercially viable and this translated into improved organizational performance (Dong & Salwana, 2022). Otherwise, the absence of commercial viability can lead to failure that can deteriorate organizational performance. Similarly, if innovation projects are technologically feasible, organizational performance is likely to improve (Baloch et al., 2022). The aforementioned discussion leads to the following hypotheses:

H4. Success of innovation (SUI) positively influences organizational performance (ORP).

H5. Failure of innovation (FAI) negatively influences organizational performance (ORP).

The interpretation of each of the constructs used in this study, with respective sources, have been provided in a tabular form reflected in Table 1.

The conceptual model including all the hypothesized relationships is illustrated in Fig. 1.

4. Research methodology

To test our research hypotheses, we conducted a survey using a questionnaire whose feature are illustrated in the ensuing section.

4.1. Preparation of questionnaire

Based on extant literature and constructs (Table 1) a questionnaire was designed. Questions use a 5-point Likert scale with Strongly Disagree (SD) marked as 1 to Strongly Agree (SA) marked as 5. Consistently with many other empirical studies relying on surveys, a 5-point Likert scale was deployed because its application is simple and because it allows respondents to take a neutral stand by choosing the “neither disagree nor agree” option. To enhance the readability of the questions, a pretest was conducted by analyzing the opinions of eight experts. Out of these eight experts, three came from academia, each having more than ten years of research experience in the field of innovation management and project management. The remaining five experts came from several industries such as automotive, pharmaceutical, textile, information technology, telecommunication, and retail, possessing at least 15 years of professional experience. The opinions of the experts helped fine tune and enhance the readability of the questionnaire. To ensure comprehensiveness of the questionnaire, after the pretest stage, a pilot test was performed by analyzing the responses of 30 respondents selected through convenience sampling. These 30 respondents were not included in the main survey. The inputs of the 30 respondents helped to modify and fine tune some 26 of the questions. The list of questions in the form of statements along with the sources is provided in the Appendix.

4.2. Data collection

Some of the coauthors have engaged with different Indian business associations like the Confederation of Indian Industry, the Federation of Indian Chambers of Commerce & Industry, the PHD Chamber of Commerce and Industry. In addition to convenience, there are other reasons that led to collecting data from India. First, India is the fifth largest economy of the world (World Economic Forum, 2022), and it recently surpassed the UK in terms of GDP (Aldrick and Goodman, 2022). Secondly, India is an important member of BRICS countries/economies, that group of emerging countries that is growing at the fastest pace.

Table 1
Factors, sources, and interpretation.

Factors	Source(s)	Interpretation
Organization innovation capability	Francis and Bessant (2005); Bogers (2011); Aziz & Samad (2016); D’Este et al. (2016); Coad et al. (2021)	The organizational innovative capability plays an important role in determining the position of the organization with respect to its competitors. The organizations which have relatively better innovation capability enjoy better competitive advantage. Investing to develop a superior innovation capability is considered a key priority for the management of the organizations.
Commercial viability	Madique and Zirger, 1984; Cooper and Kleinschmidt (1987); Wong & Zeng (2015); Baloch et al. (2022)	Commercial viability in terms of innovation projects or an innovative product is explained as the ability of an organization to compete effectively in the open marketplace, improve revenue stream, as well as make profit. Commercial viability of innovation is important for the success of the organizations. It is related to the overall performance of the organizations.
Technological feasibility	Lester, 1998; Bessant (1993); Keegan & Turner (2002); Laschi et al. (2016); Coad et al. (2021)	Technology feasibility is an essential part of innovation related projects. Such feasibility analysis is performed to understand the viability of investing in developing the new product (s). Technology feasibility also helps organizations to determine which are the technologies that could be applied to the innovation projects which have the most likelihood to have an economic success.
Success of innovation	Cohen (2010); Gajendran et al. (2014); Aziz & Samad (2016); Chaudhuri & Vrontis (2021)	The success of innovation is explained as an innovation which can clearly create a differentiated value to the organizations as well as for the sets of external buyers. While such successful innovation can cost a lot of resources to the organizations at the initial phase, such successful innovation can create a lot of profit with huge amount of revenue generation for the organizations.
Failure of innovation	Bogers (2011); D’Este et al. (2016); García-Quevedo et al. (2018); Coad et al. (2021); Forsman (2021)	Failure of innovation can take place due to various circumstances. One of the primary reasons is the lack of strategic planning for the innovation project. Also, the innovation project can fail due to lack of budgetary support by the organizations. Sometimes, the innovation project fails due to lack of skill sets of the teams involved, competition,

(*continued on next page*)

Table 1 (*continued*)

Factors	Source(s)	Interpretation
		external business environment, and change in the organizational mission. Here, it is also important to learn from innovation failure to become successful in the subsequent innovation projects. Thus, learning from past innovation failure is also important.
Organization performance	Cohen (2010); Gök and Peker (2017); Chatterjee et al. (2021); Baloch et al. (2022); Dong & Salwana (2022)	Organizational performance in terms of innovation is explained as the ability of an organization to reach its goals and optimize the results obtained through appropriate innovation. In other words, the performance of an organization can be defined as the ability of the organization to achieve its objectives and goals in a state of volatile marketplace and constantly changing business environment.

Third, there are many Indian organizations dealing with innovation-related projects, that are trying to constantly improve their innovative capabilities. In summary, the collection of data in India was driven by both convenience and purposeful sampling criteria.

Through the above-mentioned linkages, it was possible to write down a list of 400 organizations inclusive of their contact details. Out of the 400 organizations, 341 organizations were found to have been investing in innovation projects over the last 5 years. Since the unit of analysis for the survey is the organization, the top executives of these 341 organizations were requested to take part in this survey. They were informed that the aim of the project was academic in nature, and they were assured that their anonymity and confidentiality would have been preserved. All the respondents were given instructions on how to fill in the response sheets. All these 341 top executives were requested to respond within three months (October–December 2022). By the deadline, 327 executives responded. On scrutiny of these 327 responses, 13 responses were incomplete. These were not retained. Subsequently, a PLS-SEM analysis was conducted on the responses. Detailed descriptive statistics on the 314 organizations are provided in Table 2.

5. Data analysis and results

To test the hypotheses and the conceptual model, a partial least square structural equation modelling (PLS-SEM) technique was adopted, since it helps analyze complex models (Akter et al., 2011). This process does not require data to be normally distributed and this process does not impose any sample restriction (Sarstedt et al., 2014; Akter et al., 2017).

5.1. *Computation of different parameters and discriminant validity*

To ascertain the convergent validity, the loading factor (LF) of each of the items was computed. To verify the validity and reliability of the constructs, average variance extracted (AVE) and composite reliability (CR) have been estimated. To examine the internal consistency of all the constructs, their Cronbach's alpha (α) was computed. All values of LFs are found to be greater than 0.7 (Chin, 2010) and the estimated values of AVEs are found to be greater than 0.5 (Hair et al., 2017). The results are provided in Table 3.

To analyze the discriminant validity of all the constructs, the Fornell and Larcker criteria (Fornell and Larcker, 1981) have been used. The square roots of all the AVEs are greater than the bifactor correlation coefficients. Table 4 provides the results.

Table 2
Profile of the organizations (N = 314).

Particulars	Category	Frequency (n)	Percentage (%)
Organization age	Older organizations (>20 years of establishment)	115	36.61
	Younger organizations (5–20 years of establishment)	65	20.71
	Startups (<5 years of establishment)	134	42.68
Organization size	Large organizations (>10,000 employees)	108	34.39
	Midsize enterprises (1000–10,000 employees)	62	19.75
	Small and micro-organizations (<1000 employees)	144	45.86
Organization type	Service organizations	178	56.69
	Manufacturing organizations	136	43.31
Industry	Automobile	54	17.19
	Pharmaceutical	29	9.24
	Textile	32	10.19
	Information technology	73	23.25
	Telecommunication	66	21.02
	Retail	60	19.11

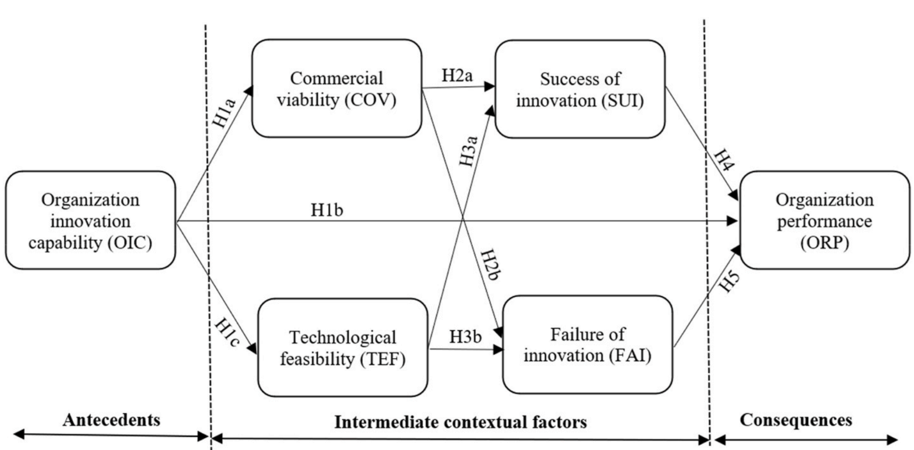

Fig. 1. Conceptual model.

Table 3
Measurement properties.

Constructs/Items	LF	AVE	CR	A	t-values
OIC		0.81	0.84	0.88	
OIC1	0.88				22.17
OIC2	0.75				26.01
OIC3	0.87				24.07
OIC4	0.89				29.11
OIC5	0.91				31.77
COV		0.68	0.81	0.83	
COV1	0.80				26.63
COV2	0.85				23.12
COV3	0.75				26.72
COV4	0.90				25.51
TEF		0.73	0.82	0.86	
TEF1	0.84				29.91
TEF2	0.87				22.01
TEF3	0.74				27.11
TEF4	0.92				31.19
SUI		0.78	0.84	0.87	
SUI1	0.87				24.07
SUI2	0.87				25.29
SUI3	0.85				34.11
SUI4	0.84				27.02
FAI		0.77	0.82	0.85	
FAI1	0.90				22.44
FAI2	0.95				31.37
FAI3	0.85				20.48
FAI4	0.80				30.88
ORP		0.75	0.80	0.87	
ORP1	0.90				23.64
ORP2	0.78				26.23
ORP3	0.85				32.95
ORP4	0.91				27.04
ORP5	0.87				26.23

Table 4
Discriminant validity test.

Constructs	OIC	COV	TEF	SUI	FAI	ORP	AVE
OIC	0.90						0.81
COV	0.26	0.82					0.68
TEF	0.29	0.19	0.85				0.73
SUI	0.32	0.38	0.26	0.88			0.78
FAI	0.21	0.22	0.17	0.19	0.87		0.77
ORP	0.23	0.33	0.29	0.22	0.24	0.86	0.75

5.2. Common method bias (CMB)

Since the study relies on survey data, it is not possible to avoid common method bias (CMB). As a procedural measure, while preparing the questionnaire, measures were taken to enhance the readability, understandability, and comprehensiveness of the questions through pretests and pilot tests. To get unbiased replies, all the prospective respondents were assured that their anonymity and confidentiality would be preserved. To ensure further that there might not be any CMB, Harman's single factor test (SFT) was conducted: the first factor came out as 23.62% of the variances. Since it is less than the recommended highest value of 50% (Podsakoff et al., 2003), there is no CMB issue. Though CMB cannot be conclusively tested by Harman's SFT as suggested by Ketokivi and Schroeder (2004), marker correlation ratio test was performed: this did not highlight any evidence of CMB.

5.3. Effect size f^2 test

To verify whether the exogenous variables influence the respective endogenous variables, effect size f^2 test needs to be performed. The values of f^2 are said to be weak if their values lie between 0.020 and 0.150, they are said to be medium if their values lie between 0.150 and 0.350, and they are said to be large if their values are higher than 0.350 (Cohen, 1988). The results are portayed in Table 5.

5.4. Hypotheses testing

To test the hypotheses a bootstrapping procedure was deployed. More specifically, 5000 resamples have been considered. With omission-separation 7, cross-validated redundancy was estimated towards each of the independent constructs. The Q^2 value came out as 0.052, which is positive. This confirms that the model has a predictive relevance (Mishra et al., 2018). To assess the model fit, the recommendations provided by Henseler et al. (2014) were followed: the standardized root means square residual (SRMR) was considered as the standard index helpful to validate the model. Their values came out to be 0.062 for PLS and 0.033 for PLSc. Both these values are found to be less than the allowable highest cutoff value of 0.08 (Hu and Bentler, 1999). This confirms that the model has a predictive relevance. By applying SEM, the path coefficients of the different linkages as well as their corresponding p-values could be computed. Also, the coefficients of determination were estimated relating to each of the constructs. The results are illustrated in Table 6.

Accordingly, the validated and tested model is represented in Fig. 2.

6. Discussion and conclusion

Based on a combination of different research strand – innovation management literature, complemented by the DCV and the concept of innovation capabilities – we developed and tested nine hypotheses. The findings demonstrate that OIC influences COV, ORP, and TEF significantly and positively since the focal path coefficients are 0.17, 0.24, and 0.11 respectively with respective levels of significance at $p < 0.01$ (**), $p < 0.01$ (**), and $p < 0.05$ (*). The results also highlight that COV influences SUI and FAI significantly as the related path coefficients are 0.22 and 0.39 respectively with respective levels of significance at $p < 0.01$ (**) and $p < 0.001$ (***). Furthermore, TEF influences SUI and FAI significantly since the focal path coefficients are 0.27 and 0.12 respectively with respective levels of significance at $p < 0.001$ (***) and $p < 0.05$ (*). We also found that SUI influences ORP positively and significantly as the focal path coefficient is 0.41 with a level of significance at $p < 0.001$ (***). This study also reveals that FAI significantly and negatively influences ORP as the focal path coefficient is −0.49 with a level of significance of $p < 0.001$ (***). As far as coefficients of determination are concerned, the results demonstrate that COV and TEF could be separately predicted by OIC with an explained variance of 39% and 31% respectively. The study also shows that SUI could be predicted simultaneously by COV and TEF with an explained variance of 37% whereas FAI could be predicted by COV and TEF simultaneously with an explained variance of 46%. The result shows that ORP could be predicted simultaneously by SUI, OIC, and FAI with an explained variance of 71% which is the predictive power of the proposed conceptual model. It is worthwhile mentioning that the coefficient of determination is a number assuming values between 0 and 1 (=100%) and helps assessing how effectively a statistical model (e.g., a set of independent variables or predictors) can predict an outcome variable. This work has demonstrated that OIC influences significantly and positively COV, ORP, and TEF: this is in line with a study by van der Panne et al. (2003) which highlighted that innovation could impact technological and commercial

Table 5
Effect size f^2 test.

Constructs	COV	TEF	SUI	FAI	ORP
OIC	0.171 (M)				
COV		0.112 (W)	0.223 (M)	0.394 (L)	
TEF			0.275 (M)	0.121 (W)	
SUI					0.413 (L)
FAI					0.431 (L)

Table 6
Structural equation modelling (SEM).

Linkages	Hypotheses	Path coefficients	p-values	Remarks
OIC→COV	H1a	0.17	$p < 0.01$ (**)	Supported
OIC→ORP	H1b	0.24	$p < 0.01$ (**)	Supported
OIC→TEF	H1c	0.11	$p < 0.05$ (*)	Supported
COV→SUI	H2a	0.22	$p < 0.01$ (**)	Supported
COV→FAI	H2b	0.39	$p < 0.001$ (***)	Supported
TEF→SUI	H3a	0.27	$p < 0.001$ (***)	Supported
TEF→FAI	H3b	0.12	$p < 0.05$ (*)	Supported
SUI→ORP	H4	0.41	$p < 0.01$ (***)	Supported
FAI→ORP	H5	−0.43	$p < 0.01$ (***)	Supported

viability of an innovation project, influencing organizational performance. This work also found that commercial viability and technological feasibility impact significantly on both innovation success and failure that is consistent with the study of Coad et al. (2021) that highlighted the dark side of innovation. The findings reveal that COV and TEF play a critical role in innovation failure. However, such failure at the same time provides the organizations with an opportunity to further learn to redesign their business practices to ensure better overall organizational performance.

6.1. Theoretical contributions

The present study has made several theoretical contributions. First, this study has innovatively combined the resource-based view (RBV) (Barney, 1991), the dynamic capabilities view (DCV) (Teece and Pisano, 1994; Teece et al., 1997) and the innovation capabilities concept (Francis and Bessant, 2005) to develop a conceptual model that explains innovation failure and also the extent to which innovation failures (as well as innovation success) influence organizational performance. This represents a theoretical extension of the mere RBV and DCV as this study recognizes that innovation capabilities need to be systemically matched with organizational resources to engender innovation outcomes, including innovation failures. More specifically, this extends the work of Francis and Bessant (2005) that do not take explicitly into account the theoretical linkages between the RBV, the DCV and innovation capabilities and do not focus on the relevance of innovation capabilities as a driver of enhanced organizational performance.

Secondly, and related to the first point, it seems that the combination of the DCV and innovation capabilities is a suitable framework to understand how organizations sense, seize and reconfigure innovation opportunities in a highly turbulent business environment. DC allow to make innovation projects feasible and commercially and technologically viable, with a view to improve the overall organizational performance. This further extends the dynamic capabilities view (DCV) (Teece and Pisano, 1994; Teece et al., 1997) as we find that there are specific factors that are conducive to innovation failure that have not been identified in other innovation failure literature deploying a DCV perspective (Ren et al., 2016). In particular, Ren et al. (2016) only suggest in passing in their abstract that "firms should reduce innovation failures and lower damage degree of dynamic capabilities through consistent innovation" (Ren et al., 2016: p. 45). However, this is a possible recommendation of their study that does not relate directly dynamic capabilities to the focal topic of this study.

Third, there are studies that have highlighted causes for innovation failure in SMEs (Forsman, 2021), different strategies to be adopted to learn from failures (Edmondson, 2011), as well as strategic causes for product innovation failure (D'Este et al., 2016). However, these studies have discussed either budgetary constraint, or inappropriate planning and forecasting issues or other strategic issues for innovation failure in a fragmented manner. We hope and believe that this work has extended that research line by showing more holistically that appropriate support of the management, adequate budgetary allocation, improved skillsets of the employees, and appropriate innovation strategy are important factors to mitigate the risk of failure of an innovation project. This study also extends the aforementioned research line by finding that investigating the issues of innovation failure can help organizations learn for future innovation projects.

Fourth, to the best of our knowledge this is the first study that has developed a theoretically driven conceptual model highlighting how organizational innovation capabilities – by acting on technological and commercial feasibility – despite innovation failures, can improve organizational performance. This is an extension to innovation failure literature (Forsman, 2021) in the sense of translating extant literature into a parsimonious but comprehensive conceptual model connecting antecedents and consequences of innovation failure.

6.2. Implications for managers and practitioners

This work generates several practical implications for managers and practitioners. First, they should improve organizational innovation capabilities as these allow to enhance commercial viability and technological feasibility. Second, as commercial viability depends mainly on product related factors and market related factors, organizational leaders should improve the quality of the products and keep the price of the products within affordable range compared to the identical types of products available in the market. Third, focusing on the market changes, managers should develop products commensurate with the needs of the consumers in the volatile markets. Moreover, with the appropriate innovation capability of the organizations, managers should focus on the convenience of usage of the newly developed products and its after sales service for sustaining competitive advantage. Fourth, organizational leaders and managers should apply to select appropriate market so that they can capture the maximum number of consumers through their new products. Fifth, as successful innovation helps accelerated growth, organizational leaders should invest more to develop organizational

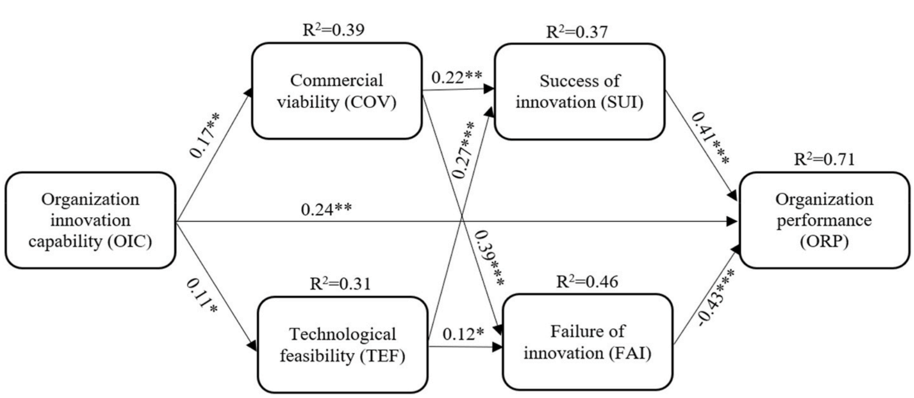

Fig. 2. Validated model (SEM).

culture so that R&D activities might be strengthened to enhance the technological feasibility of new products.

6.3. Limitations and future research

This study displays several limitations. First, the findings depend on the analysis of cross-sectional data: this might generate endogeneity defects. Future research might overcome this issue by adopting longitudinal research designs. Secondly, the findings depend on an analysis of data collected in India. Future studies might need to collect data from respondents from other countries, to make sure that findings can be generalized. Third, the explanatory power of the proposed theoretical model is 71%. Future research should consider other determinants and boundary conditions to check if the explanatory power of the proposed theoretical model could be enhanced. Fourth, this study did not consider control variables. As this might be considered as a limitation of this study, future research might need to examine the effect of control variables on the main relationships that we tested as part of the model developed. Fifth, this empirical study did not put forward and analyze any rival or alternative model. This could have represented an opportunity to compare the rival model with the proposed conceptual model to assess whether the proposed theoretical model is superior to the rival model or not. Future researchers might develop such alternative models.

Conflict of interest or acknowledgments

None.

Data availability

The data that has been used is confidential.

Appendix. Summary of Questionnaire

Items	Source	Statements	Response [SD][D][N][A][SA]
OIC1	Kleinknecht et al. (1997); Vu & Nwachukwu (2021)	I believe that innovative organizations grow faster and are more profitable.	[1][2][3][4][5]
OIC2	Baumol (2002)	Innovation is the most critical factor in improving and sustaining organizational performance.	[1][2][3][4][5]
OIC3	Madique and Zirger, 1984	Our organization invests adequately in innovative projects.	[1][2][3][4][5]
OIC4	Baloch et al. (2022)	I believe that innovative organizations have better competitiveness.	[1][2][3][4][5]
OIC5	Francis and Bessant (2005); Helm et al. (2019); Binci et al. (2020)	There are several benefits that organizations could gain by improving their innovation capability.	[1][2][3][4][5]
COV1	Cooper and Kleinschmidt (1987); D'Este et al., 2018	I believe that commercial viability is an important aspect while investing in an innovation project.	[1][2][3][4][5]
COV2	Wong & Zeng (2015); Hartley and Knell, 2022	Not all the innovation projects are commercially viable at the initial stage.	[1][2][3][4][5]
COV3	Vinck (2017); Baloch et al. (2022)	The innovative product from the organization may not always get good response from the targeted customers.	[1][2][3][4][5]
COV4	Qin and van der Rhee (2021); Hartley and Knell (2022)	Organizations should put adequate effort during the planning stage of any innovation project.	[1][2][3][4][5]
TEF1	Lester, 1998; Bessant (1993)	I believe that technology feasibility is an essential part of innovation related projects.	[1][2][3][4][5]
TEF2	Keegan & Turner (2002); Coad et al. (2021)	Feasibility analysis is critical to understanding the viability of development of new products.	[1][2][3][4][5]
TEF3	Bessant (1993); Laschi et al. (2016)	I think that technological feasibility helps in determining the technologies that could be applied to the innovation projects.	[1][2][3][4][5]
TEF4	D'Este et al., 2018; Coad et al. (2021)	I believe that technical feasibility study helps in examining which technology is most likelihood to have an economic success.	[1][2][3][4][5]
SUI1	Aziz & Samad (2016)	Innovation success will create a differentiated value to the organizations.	[1][2][3][4][5]
SUI2	Cohen (2010); Gajendran et al. (2014)	I believe that successful innovation through development of new products delights the external buyers.	[1][2][3][4][5]
SUI3	Gajendran et al. (2014); Aziz & Samad (2016)	I think that any successful innovation project needs a lot of resources during the initial phase.	[1][2][3][4][5]
SUI4	Cohen (2010); Gajendran et al. (2014)	I believe that any successful innovation project can create a lot of profit for the organizations.	[1][2][3][4][5]
FAI1	D'Este et al. (2016); Forsman (2021)	I believe that lack of strategic planning is the prime reason for failure of any innovation projects.	[1][2][3][4][5]
FAI2	García-Quevedo et al. (2018)	I believe that lack of leadership support is one of the critical issues for the failure of a innovation project.	[1][2][3][4][5]
FAI3	Bogers (2011); D'Este et al. (2016)	Due to lack of skillsets of the teams involved in innovation project, the project becomes unviable.	[1][2][3][4][5]
FAI4	Coad et al. (2021); Forsman (2021)	Lack of budgetary support is a key reason for failure of the innovation project.	[1][2][3][4][5]
ORP1	Gök and Peker, 2017; Rhaiem & Amara 2021a, b	Improvement of innovation capability helps the organization to achieve better profitability.	[1][2][3][4][5]
ORP2	Hopkins (1981); Bessant, 1993; Baloch et al. (2022)	Successful innovation can help to achieve better results and meet the goals of the organizations.	[1][2][3][4][5]
ORP3	Cohen (2010); Gök and Peker (2017)	I believe that a successful innovative product can improve the revenue generation for the organizations.	[1][2][3][4][5]
ORP4	Archibugi et al. (1991); Dong & Salwana (2022)	I believe that innovation projects is closely related to economic sustainability of the organizations.	[1][2][3][4][5]
ORP5	Baloch et al. (2022); Dong & Salwana (2022)	An organization with superior innovation capability can retain its customers and gain competitive advantage.	[1][2][3][4][5]

Note: SD = Strongly Disagree; D = Disagree; N = Neither disagree nor agree; A = Agree; SA = Strongly Agree.

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