Can you tell a good open innovation failure from a bad one?

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Purpose

Open innovation (OI) failures are considered a uniform class of undesirable outcomes. This article emphasises that two classes of failure exist: "bad", triggered by preventable causes such as negligence, lack of skills or inadequate procedure, and "good", stemming from hard-to-predict causes inherent in innovation endeavours. This article clarifies the differences between good and bad failures, describes their causes, and recommends countermoves to mitigate "bad" failures.

Design/methodology/approach

We conducted a single case study analysis examining OI in Leonardo, a multinational aerospace and defence company. Our study leverages the experience of "innovation focal points" and senior managers in Leonardo, conducting 19 semi-structured interviews and an abductive thematic analysis.

Findings

The thematic analysis led to the identification of several causes leading to “good” and “bad” failures. We grouped the causes of good failures into three domains: lack of experience, unexpected market scenario, and unsuitable or unprofitable technology. We grouped the causes of bad failures into five domains: internal causes of failures, risk management, partner selection, coordination and negotiation, and intellectual property.

Practical implications

This article provides actionable guidance to mitigate the causes of "bad" failures, allowing managers to reap the full potential of OI. Examples of countermoves discussed in this article include OI training and education programs, implementing and maintaining a risk management process, and IP protection mechanisms.

Originality/value

This is the first article to provide ontological insights distinguishing “good” and “bad” OI failures and suggest appropriate countermoves for “bad” OI failures. The article sets a new perspective that could trigger a new epistemological process.

Keywords

Open innovation; Innovation failure; Good innovation failure; Bad innovation failure

1 Introduction

"*No one wants to learn by mistakes, but we cannot learn enough from successes to go beyond the state of the art*". This quotation from Petroski's book (1985) embraces failure as an essential source of learning, a key concept in innovation studies (Baxter, Trott and Ellwood, 2023).

There are at least two essential aspects to discuss when looking at innovation failures: causes and consequences. Based on their causes, Edmondson (2011) categorises failures as "bad" or "good". "Bad" or "blameworthy" failures are caused by inattention, lack of skills or a decision to violate a prescribed practice; in general, preventable causes characterise "bad" failures (Edmondson, 2011). Contrariwise, "good" or "praiseworthy" failures are triggered by hard-to-predict causes (e.g., unexpected experiment results, unpredictable changes in market conditions, process failures in complex systems), which are typical of "combinations of needs, people and problems" that never occurred before (Edmondson, 2011). Such failures are integral elements of breakthrough innovation endeavours.

"Bad" and "good" failures also differ in their consequences. We advance that "bad" failures have little to teach (e.g., a prescribed practice should not be violated), while the learning stemming from "good" failures can be valuable from an innovation perspective. Indeed, "good" failures can be analysed and formalised, creating new explicit knowledge and developing organisational capabilities and know-how (e.g., understanding that specific inputs or environmental conditions lead to a particular experimental result).

Leveraging Edmondson's perspective, this article focuses on innovation failure stemming from open innovation (OI). This paradigm campaigns for placing part of the innovation processes outside the organisational boundaries (Obradović, Vlačić and Dabić, 2021). While Edmondson's perspective focuses on the dichotomy of "good" vs "bad" failures in innovation in general, this study examines this dichotomy in the context of OI. Due to the specific nature of OI, which encompasses the

complexity of inter-organisational flows of ideas, knowledge and technologies, a more nuanced understanding of "good" and "bad" failure in OI is important.

Most studies on OI show and discuss its beneficial effects (Laursen and Salter, 2014; Lee *et al.*, 2019; Bagherzadeh, Markovic and Bogers, 2021; Obradović, Vlačić and Dabić, 2021), with few exceptions dealing with the underlying costs and drawbacks (Laursen and Salter, 2014; Cappa *et al.*, 2019; Greco, Grimaldi and Cricelli, 2019). While OI benefits are thought to exceed its costs, this cannot be taken for granted. Indeed, OI may well fail (Dabić *et al.*, 2023). Despite the potentially significant consequences of an OI failure on a firm (e.g., in economic, strategic, or communication terms), very few studies have investigated OI failure so far (e.g., Bigliardi and Galati, 2016; Greco, Strazzullo, *et al.*, 2022; Puliga *et al.*, 2023). Remarkably, none of them distinguish between "good" and "bad" failures.

This article fills this gap by examining OI failures within Leonardo, a multinational aerospace and defence company (Leonardo Group, 2024). In particular, the aim of this article is twofold. First, it aims to distinguish between "good" and "bad" OI failures, addressing the research question *"Which causes characterise "good" and "bad" OI failures?"*. Second, it aims to provide recommendations to mitigate "bad" failures. Shedding light on these aspects can be relevant for managers. Indeed, preventing "bad" OI failures can save resources, whereas managing "good" OI failures elicits learning.

The rest of the article is structured as follows. Section 2 provides the background of this Real Impact Research Article, focusing on OI failures. Section 3 presents the research design. Section 4 discusses how interviewees perceived OI and OI failure. Section 5 details the characteristics of "good" and "bad" OI failures. Section 6 focuses on the causes of "bad" OI failures, while Section 7 proposes countermoves to mitigate them. Section 8 draws the conclusions.

2 From innovation failure to open innovation failure

The elusive nature of innovation failures presents many challenges, starting with the question of what innovation failure means. The most frequent conceptualisation - albeit extreme - sees failure as the antonym of success (Baxter, Trott and Ellwood, 2023) or - put differently to fit the context - as the non-completion or abandonment of an innovation project (Hyll and Pippel, 2016). This conceptualisation cannot capture the complex shades that go from a catastrophic failure to an overwhelming success.

For instance, time complicates things since a failure at a certain point may trigger future success through learning by failing (van der Panne, van Beers and Kleinknecht, 2003). Furthermore, a failure may become a success or be seen from different perspectives over time. For example, the construction of the Pisa Tower - a "defective", overbudget and late project that took two hundred years to complete a leaning tower - attracted millions of tourists centuries after its construction, ultimately becoming a success.

Regarding the link between OI and failure, there are two main streams of studies: the one focusing on the relationship between the OI paradigm and the likelihood of innovation failure and the one examining the causes of OI failure.

The first stream mainly refers to studies discussing how OI can be associated with lower odds of abandoning innovation projects (Guzzini and Iacobucci, 2017; Greco, Grimaldi and Cricelli, 2020). Indeed, ideas, knowledge, and resource exchanges in an inter-organisational collaboration can increase the firm's chances of overcoming the possible causes of failure; examples of causes of failure include lack of skills, lack of information about the market, and financial issues (Guzzini and Iacobucci, 2017). Consistently, firms investing in acquiring external knowledge or equipped with a broader network of external partners are less likely to abandon innovation projects (Greco, Grimaldi and Cricelli, 2020).

The second stream refers specifically to OI failures, focusing on the causes of OI failures but without distinguishing between "good" and "bad" OI failures. Among them, Bigliardi and Galati (2016) pointed out that opportunistic behaviour, cultural resistance, bureaucratic burdens, and economic and managerial issues can lead to OI failures. In the same vein, Greco et al. (2022) discussed several potential causes of OI failures, including poor project management, inadequate partner selection (e.g., involving incompetent partners or partners that opt out from an ongoing project), inadequate market analysis (which may lead to products that are not marketable), coordination issues, and economic issues (e.g., incorrect budget forecasts, failure to market the products, funds unavailability).

Interestingly, Holgersson et al. (2022) analysed the closure of OI initiatives - which in some circumstances could be considered a failure - discussing several factors leading to such an outcome: legal and regulatory constraints, economic issues (as in the case of the crowdsourcing company Quirky, whose costs were not covered by its revenues), changes in the business model, disappointment with their partners and opportunistic behaviour. More recently, Puliga et al. (2023) mentioned market-related issues such as short-term orientation, market uncertainty and fierce competition as key elements that can trigger an OI failure.

Furthermore, the approach adopted regarding Intellectual Property (IP) can play a relevant role in OI failure. Indeed, a closed approach over IP (i.e., avoiding sharing IP with partners) is more frequently associated with OI failure than a selective sharing approach (i.e., purposely sharing some IP) (Brunswicker and Chesbrough, 2018). Furthermore, IP protection triggers costs (Foege *et al.*, 2019), which may hamper OI initiatives. However, in more recent studies, IP did not emerge as a key cause of OI failure (Greco, Strazzullo, *et al.*, 2022; Puliga *et al.*, 2023). In fact, even if IP protection mechanisms are typically exploited by firms adopting a closed innovation paradigm, protecting IP can also reassure firms and foster knowledge sharing with other organisations.

3 Research design

We leveraged a single case study approach, examining OI failures in Leonardo. As detailed in the next section, the case examined is peculiar (Siggelkow, 2007) and allows gaining insights into the causes of OI failures. Once we identified the causes, we focused on bad OI failures, searching for suitable solutions to prevent their causes in the body of knowledge.

3.1 The case

We studied OI failures in Leonardo, a multinational company headquartered in Italy with an annual turnover of 17.8B€ and more than 60’000 employees (Leonardo Group, 2024). Leonardo operates in the aerospace, defence, cybersecurity and automation industries.

Leonardo's top management recognised the relevance of OI two decades ago by implementing multiple OI programs. Leonardo recently introduced 30 new middle-management positions named “innovation focal points”, trained them about OI, and routinely involved them in new OI programs. The latter include, among others, accelerating promising startups in emerging technologies, crowdsourcing solutions based on technological needs, promoting OI challenges on drones, and encouraging technology transfer.

LUISS Business School organised the OI training of the “innovation focal points”, providing middle managers with an overall understanding of the OI paradigm and its multiple forms and opportunities. The 64-hour course included the following topics: innovation strategy, OI, OI implementation, innovation ecosystem, managing IP within OI, acquiring firms, OI success and failure, customer innovation, crowds and IP, and organising OI networks through internal and external frameworks. Henry Chesbrough conducted some of the lessons.

The commitment of the top management to embrace the OI paradigm triggered an unprecedented number of OI projects, providing a unique opportunity to extrapolate the causes of “good” and “bad” OI failures.

3.2 Data collection and analysis

We targeted the “innovation focal points” and top managers working on innovation in Leonardo, conducting 19 semi-structured interviews. The interviews lasted, on average, 46 minutes and were performed by a minimum of two researchers. All interviews were conducted in Italian. We translated the main extracts and the questionnaire questions to write this manuscript. The Appendix details the semi-structured questionnaire questions used as a basis for the dialogue and the related purpose. We focused on the differences between innovation and OI, the meaning of unsuccessful OI projects, and the causes and consequences of OI failures. We also asked each interviewee to narrate at least one case of OI failure, its causes, and its consequences.

We verbatim transcribed the interviews, anonymised them, and leveraged an abductive thematic analysis (Braun and Clarke, 2012) to categorise the transcripts. In particular, we coded the transcripts based on our knowledge of the innovation failure literature and the interview evidence, defining themes and sub-themes.

The following sections present the identified themes and sub-themes, detailing the distinction between good and bad OI failures and the proposed countermoves to mitigate the causes of “bad” OI failures. Both the distinction between "good" and "bad" OI failures and the recommendations to prevent OI failures were validated through a workshop with “innovation focal points” and top managers working on OI in Leonardo.

4 Understanding open innovation and failure

4.1 Open innovation virgin, again!

OI is an umbrella term that includes different domains, from regional innovation ecosystems to co-designing a new component with a supplier, from crowdsourcing to collaborating with a university, from patent licensing to open-source software, from startup incubation to the establishment of joint ventures. Expertise in one of these domains does not guarantee success in the others, and

overconfidence may lead to bad OI failures. Therefore, it is essential to recognise how a new OI endeavour differs from the previous ones. To do so, it is crucial to be aware of previous endeavours. Remarkably, the interviewees often did not recognise previous endeavours. Indeed, although we interviewed experienced managers who had recently completed training in OI (as detailed in Section 2.1), they perceived Leonardo as new to OI. Yet, Leonardo has at least twenty years of history in OI. How so? At least two reasons concur.

First, the OI nature of the relationship between Leonardo and universities was unclear to some extent, as these quotations point out:

> "The relationship [with universities] resembles more one with suppliers since we commission them pieces of research" [I6]; "I am the one that needs to find the right university, while in OI I share the problem and potential solvers are attracted" [I10]; "It depends on whether I ran a selection to find the best university. In that case, I did OI" [I18].

Second, Leonardo's new OI programs substantially differ from the previous (and ongoing) ones. Indeed, the new OI programs led to substantial organisational changes and the "innovation focal point" role, fostered startup incubation, funded PhD bursaries, and promoted OI challenges. Such an unprecedented commitment could justify why many interviewees felt Leonardo was taking its first steps in OI.

Interestingly, Dabrowska et al. (2013) also pointed out a misalignment between the interviewees' perception of their firms' OI initiatives and their actual innovation practices, presenting explanations for this. One proposed explanation refers to the conceptual ambiguity of OI, which should not apply to our case, where interviewees have been recently trained about the OI concept. Another refers to the interviewees' perception of OI as a modern and progressive principle in innovation management, leading them to exaggerate the self-assessment of OI activities to promote a stronger brand image. On the contrary, in our study, such perception may have restricted the interviewees' recognition of OI to only relatively recent OI programs (e.g., crowdsourcing and startup incubation), leading them to

ignore more traditional OI forms (e.g., collaboration with suppliers and universities) that Leonardo leveraged over the decades. More recently, Teplov et al. (2019) also observed that practitioners and scholars have a different knowledge about what constitutes an OI practice. Indeed, in their study, firms acknowledged startup and idea competitions as OI, neglecting collaborative innovation with partners.

We can draw at least two key insights from our findings and their link with previous studies. First, the ambiguity of OI as a too-broad umbrella term can compromise the practitioners' capability to self-assess their firm's openness, even when they are trained about OI and its forms. Second, an OI practice, such as inter-organisational collaboration aimed at innovation development, may not be considered as such if not explicitly linked to an OI strategy and business model (Chesbrough and Bogers, 2014).

4.2 This is "not" an open innovation failure

In one of Magritte's masterpieces, "Ceci n'est pas une pipe", the painter ironically accuses his realistic painting of a pipe of not being an actual pipe. Similarly, in our interviews, failure is rarely considered a failure itself. In particular, when the scope of OI projects or the envisaged benefits are not achieved, we stand before the image of failure, as most interviewees concurred. Yet, watching it closely, it resembles more a learning opportunity, from which "we need to select our partners in a better way" [I5] or "we need to make clear agreements at the start of the collaboration" [I8]. One quotation is particularly illuminating of this:

> "In some cases, not achieving the milestones or even not completing the project is also a success due to the lessons learned. Learning that something cannot be done before your competitors can be a competitive advantage" [I7].

Even though some of the investigated failures left scars, it seems easier to embrace their positives than their negatives. Similarly, Greco et al. (2022) observed that, in the context of SMEs, interviewees

did not consider unsuccessful OI projects as failures because they learned something valuable from them.

Furthermore, one interviewee pointed out how the lack of parameters to assess OI failures hinders the opportunity to understand them:

> "If I fail something well codified like an aeroplane wing, the responsibility is mine because a whole articulated pathway frames me. In the context of open innovation, instead, you miss the parameters to understand failure" [I14].

Interestingly, large organisations may be more interested in program failures (i.e., the failure of a group of OI projects that are part of the OI program, such as incubating several startups) rather than individual OI project failures. While the latter is "part of the game", the former would be significantly more worrisome, as I14 states:

> "Failure is [something that occurs] when you launch a series of initiatives, not a single project. [It occurs] if we realise, after 6 months, that all the initiatives launched have not led to an internalisation of those new ideas that were developed [...]. I see failure as something systemic, not related to a single project" [I14].

At least two considerations can be drawn from these findings. On the one hand, these findings question the traditional use of suspended or abandoned innovation projects as proxies for innovation failure (D'Este, Amara and Olmos-Peñuela, 2016; Leoncini, 2016), further emphasising the role of failure as a source of learning as discussed in previous studies (Cannon and Edmondson, 2005; e.g., Baum and Dahlin, 2007). On the other hand, the findings provide further evidence of the companies' reluctance to acknowledge failure (Tucci *et al.*, 2016; Greco, Strazzullo, *et al.*, 2022), which makes studying the phenomenon even more complex. As Greco et al. (2022) suggested, having a neutral third party assess the outcome of an OI project as a failure or not might solve the ambiguity over it. Internal audit functions could play such a neutral party role in the context of a large company.

5 Good and bad open innovation failures

Adapting Edmondson's perspective on "good" and "bad" failures, we categorised OI failures based on the causes triggering them. Unlike Edmondson, who considered "unavoidable" failures along with "good" and "bad" failures, we argue that no innovation endeavour would ever be started if its fate were to fail; therefore, we discarded "unavoidable" failures from our analysis.

On the one hand, we considered "good" OI failures those generating "valuable" learning and that are triggered by hard-to-predict issues, consistently with Edmondson in the general innovation context (Edmondson, 2011). We identified several causes leading to "good" failures, grouping them into three main domains: lack of experience, unexpected market scenario or unsuitable/unprofitable technology. On the other hand, we considered "bad" OI failures those that are triggered by predictable issues and generate "trivial" learning (e.g., avoid this mistake in the future). We identified eleven causes of bad OI failures, grouping them into five domains: internal causes of failure, risk management, partner selection, coordination and negotiation, and intellectual property. Table 1 presents the causes of OI failures that emerged during the interviews and their categorisation into eight domains.

Table 1. Causes of good and bad OI failures – I = interviewee. Source: Authors own work.

OI failure categories	Domains	Causes
"Good failures"	Lack of experience	• Failure due to the focal firm's inexperience in a particular domain, either in terms of technology or of how collaborations should be carried out [I8, I9, I13]
	Unexpected market scenario	• Working on an advanced technology or format that, unexpectedly, the market does not accept [I13, I17, I18]
	Unsuitable or unprofitable technology	• Failure to meet requirements, therefore the resulting technology cannot be implemented [I7] • The resulting technology cannot be scaled up to be incorporated in the firm's portfolio [I10] or in operations [I14]
"Bad failures"	Internal causes of failure	• Cultural barriers (e.g., not invented here syndrome, behavioural inertia, aversion to change) [I1, I15, I17, I19] • Lack of OI education [I13, I18] • Lack of internal coordination of the OI projects [I18]

Risk management	• Poor risk management or risk management processes [I4, I6, I11]
Partner selection	• Lack of experience/maturity of some partners [I3, I8, I11, I15, I16, I17] • Over-collaborating partners (i.e., collaboration with a partner involved in more endeavours than it can sustain) [I3, I10] • Subjective selection of partners [I19] • Discovering, in a low-budget OI project, that a partner is not adequate [I19]
Coordination and negotiation	• Lack of clear and shared goals and conditions at the start of the collaboration [I7, I10, I12, I13, I14, I17] • Diverging motivations or interests of the partners (e.g., interest in sharing research results in universities vs corporate) or of the generations involved [I2, I8, I17] • Unclear plan of the operations [I5, I10]
Intellectual property (IP)	• Conflicts around IP in inter-organizational collaborations [I8, I10-I12, I15, I17, I19]

Table 1 serves as a compendium for managers to avoid future bad OI failures and identify potential red flags for good OI failures.

Among the domains in Table 1, "lack of experience" was not mentioned in Edmondson's article (2011), where instead "lack of ability" emerged among the causes of bad failure. The difference between the two concepts is remarkable. Indeed, on the one hand, we advance that failures caused by lack of experience are not blameworthy since they are a part of the learning process that cannot be fully compensated with training, especially when the experimentation setting is novel. On the other hand, the lack of ability (i.e., lack of skills and training) finds space in Table 1 in multiple dimensions, including "internal causes of failure" (especially considering the inability to manage OI due to lack of training), "risk management" (when poor risk management is caused by lack of training or adequate procedures), and "partner selection" (when the lack of ability refers to partners).

Interestingly, "unexpected market scenario" and "unsuitable or unprofitable technology" are directly linked with what Edmondson calls "intelligent failures at the frontier" (2011), which require experimentation and can leap the focal firm ahead of the competition, but bearing the unavoidable risk of failure; still, they bear a powerful learning potential.

Regarding the causes of bad failure in Table 1, the domain "internal causes of failure" includes OI-related causes not discussed in Edmondson's study. Contrariwise, the interviewees did not mention the following causes of bad failure discussed in Edmondson's study (2011): deliberate deviation, inattention, lack of ability and process inadequacy. On this matter, it is reasonable to assume that the social desirability bias (Nederhof, 1985) influenced the interviewees, who may not have wanted these issues to emerge in an interview.

The other domains for bad failure, including "partner selection", "coordination and negotiation", and "intellectual property", are not directly linked to Edmonson's article, but they are partly consistent with previous studies on OI failure discussed in Section 2 (Bigliardi and Galati, 2016; Brunswicker and Chesbrough, 2018; Greco, Strazzullo, *et al.*, 2022). While some specific causes within these domains were not previously analysed, they still echo the OI literature. For instance, over-collaboration is a well-known issue affecting firms embracing the OI paradigm (e.g., Greco, Grimaldi and Cricelli, 2016), even though it is not usually mentioned among the causes of failure. In the rest of the paper, we zoom in on the causes of "bad" OI failures to frame potential initiatives that could prevent or mitigate their causes.

6 Causes of bad OI failures

6.1 Internal causes of failure

Three main internal causes of bad OI failures emerged from the case study analysis: cultural barriers, lack of OI education and lack of internal coordination.

6.1.1 Cultural barriers

The quintessential cultural barrier to OI is the "not invented here syndrome" (NIHS). It occurs when an idea, technology or approach developed in another organisation is accepted with suspicion or manifestly opposed and deemed inferior to internally developed ones (Katz and Allen, 1982). As it often happens in OI (e.g., see the review by Antons and Piller, 2015), the interviewees experienced

this issue in various forms, such as the existence of prejudices on externally developed solutions [I6], organisational inertia and change aversion [I1], and distrust [I19].

The actual or perceived need for confidentiality is another barrier to OI, which may hamper the information exchange and compromise an ongoing OI project. Cultural barriers can be even subtler; indeed, the organisational mindset can bring employees with decades of experience to see with suspicion OI projects in their domain:

> "How is a six-month program useful to me when I'm working on 20-year projects?" [I4].

Managers can reduce these barriers, but they could also worsen them. Indeed, one interviewee observed that the lack of commitment at the managerial level determined that externally developed technologies were not adopted:

> "The need is there, the solution is there […], and at a much more reasonable cost than in the past; however, we continue to work as we always have, and this opportunity does not take off" [I1].

This is an uncommon finding since the literature usually depicts managers as the ones addressing the issue rather than causing it (Hannen *et al.*, 2019; Ismail *et al.*, 2023).

6.1.2 Lack of OI education

Embracing OI often forces human resources to approach new contexts and technologies, where they might be unable to recognise the opportunities that OI projects could bring, condemning them to fail. On this matter, I13 stated:

> "The failure stemmed from a lack of awareness about this analytics world and the added value it could bring" [I13].

Another issue is distinguishing how an OI project runs differently from a traditional closed-innovation one, as I18 mentioned:

> "I cannot manage an open innovation project the way I would manage an internal innovation project because probably it would not work" [I18].

6.1.3 Lack of internal coordination of the OI projects

In large organisations, multiple OI projects may be promoted in parallel to increase the chances of obtaining the desired outcome. Multi-division organisations may struggle to keep all projects under control. For instance, I18 described how two organisational units commissioned two similar research projects to the "same" external partner without each other knowing, causing almost the duplication of costs. An interviewee provided a recommendation to overcome this issue:

> "In my opinion, open innovation cannot go without a strict organisation. This term [OI] hints at creative contamination between external and internal entities, but, in my opinion, the presence of a firm that makes the decisions about who gets what, what the budget is, and who does what is essential" [I14]

While organisations increasingly hire OI directors, their roles and responsibilities are not always well defined, especially when approaching newer OI forms, such as crowdfunding, hackathons and open data initiatives.

6.2 Risk management

The interviewees often considered the OI projects they were involved in as "low risk" due to the limited investments and strict non-disclosure conditions guaranteeing know-how protection. However, assessing the inherent risk of a new OI project should not be neglected. Indeed, in addition to the opportunistic behaviour of the partners, an OI project often entails sharing data, whose loss or dissemination could cause significant damage.

Furthermore, the risk of changes in the mega-environment can compromise the OI outcomes. On this matter, I6 provided an example of a new solution that was fully developed, but an unexpected change in the regulation put it out of the market. The lack of a monitoring process, which was not in place in this example, can cause the OI project failure. Similarly, the lack of an initial risk assessment can trigger an OI project based on assumptions that may conflict with reality, as I11 observed. Consistently, I3 and I4 reported cases of OI projects that started enthusiastically because they sounded

interesting to the managers. However, they were then dismissed as unjustified from the end-user perspective.

6.3 Partner selection

Partner selection is a key task when embracing the OI paradigm. Organisations are more likely to benefit from OI when partners own adequate absorptive capacity (Cohen and Levinthal, 1990) and when partners' competencies and technologies are similar enough to allow knowledge exchanges. At the same time, partners should have distinctive skills, ideas, and technologies that justify a collaborative innovation endeavour. Unfortunately, asymmetric information may induce the focal firm to involve less experienced or competent partners than expected. Other times, a qualified partner may be involved in too many OI projects and may not have enough time for the OI project the focal firm is interested in. While a thorough selection process might address these issues, OI projects are always the initiative of individuals who may prefer searching for partners within their comfort zone (e.g., previous partners in other projects). In this section, we discuss these three causes of bad OI failures that are part of the domain "partner selection".

6.3.1 Lack of experience/maturity of some partners

Discovering that a partner cannot deliver the expected outcome leads to a bad OI failure. Our interviewees observed this issue with a few startups:

> "We understood that the product of one of the startups we accelerated last year was still immature. Eventually, they stopped following us. We were asking for things that were out of their capabilities [...]. I cannot ask the startup to work on something as complex as what I would ask my internal divisions" [I16].

It is not only a problem of competence or hard skills. Indeed, managerial and organisational skills are equally important:

> "This startup, fresh out of the university from the physics department, did not have the right business mindset. They were very knowledgeable about the subject but did not organise the project well" [I8]; "When startups are not structured to some extent, working together becomes very difficult" [I16].

6.3.2 Over-collaborating partners

Over-collaboration is an issue often discussed in the OI literature. As the number of collaborations increases, the incremental benefit that can be drawn from OI decreases (Greco, Grimaldi and Cricelli, 2016). A frequent recommendation to managers is not to simultaneously embark on too many OI projects since information overload can be detrimental (Laursen and Salter, 2006; Abhari and McGuckin, 2023). Similarly, collaborating with partners involved in too many projects can also be detrimental [I3]. However, understanding how many innovation projects a potential partner is involved in is usually not a priority in the partner selection process. If this point is considered, a partner involved in many endeavours could even be seen favourably as a proxy of reliability, technological avant-garde, or relevance as an industrial partner. Conversely, the involvement in multiple projects could slow down or even compromise OI projects if the partner is not equipped to handle all these projects.

6.3.3 Subjective selection of partners

Mutual trust between partners fosters OI projects. It is not surprising that managers select partners based on their acquaintances. While proximity and familiarity among partners are usually seen as factors mitigating the risk of failure and IP misappropriation (Purdy *et al.*, 2023), the interviewees highlighted how they could unintentionally threaten the partner selection process. On this point, I19 stated:

> "We sometimes do not make choices based on objective market or technological evaluations, but for different reasons; for example, I know a person, and I trust that person to collaborate. There is a proximity issue in the selection phase" [I19].

Therefore, personal links can be fruitful but can also hinder an appropriate partner selection process.

6.4 Coordination and negotiation: clear rules make for lasting friendships

The lack of clear and shared goals at the start of the collaboration is a preeminent cause of bad OI failures. However, goals are not the only aspect on which to concur. This subsection describes the nuances that should be agreed on and the related extracts from the interviews.

6.4.1 Lack of clear and shared goals: did we agree with our partners on the goals of the OI project?

Several interviewees considered the lack of clear and shared goals a key cause of OI project failure. For instance, I12 defined OI failure as follows:

> "I consider a project a failure when its outcome deviates from the initial goals, which were probably not properly shared between the parties because perhaps each party had a hidden agenda that they were unwilling or unable to share" [I12]

Moreover, the lack of clarity on the goals can stress the people involved, as highlighted by I7:

> "The non-definition of what the main goal of the open innovation process is [...] leads to grey areas and randomness, also generating stress when you fail to achieve the goals" [I7].

6.4.2 Diverging motivations or interests of the partners: to what extent can they affect the outcome?

Even when a clear goal is stated, the underlying motivations of the partners can lead them to deviate from the agreed path. For instance, collaboration with universities can be affected by academics' interest in publishing articles, as stressed by I17:

> "A major limitation we have in seeking collaborations with universities is that the goals often diverge. We have the goal of solving a problem, whereas, in the university, there may be a very academic approach […], related to the number of publications that will stem from the project" [I17].

Similarly, collaboration with startups implies understanding their different approach regarding business, expectations and culture. On this matter, I14 pointed out:

> "Open innovation failure was triggered by the lack of awareness about the counterpart's expectations [...]. If we do not understand the strategic and marketing interests of the startup, along with its perspectives, the negotiations can fail, and open innovation failure may occur as a consequence" [I14].

6.4.3 Unclear plan of the operations: what is the sequence of activities the OI project will comprise?

Even though OI requires flexibility among partners, the lack of a basic operations plan - defining, for instance, who will oversee the activities and when the deliverables are expected - is a significant threat to an OI project. On this matter, I10 stated:

> "Open innovation failure comes from unclear conditions at the beginning […] and from an unclear process about how the sequence of the developments should be structured" [I10].

The lack of a plan can lead to deviations and opportunistic behaviour that can turn an OI project into a toxic endeavour for the focal firm.

6.5 Intellectual property: did we agree on these aspects of our OI project?

A paradoxical relationship between IP and OI occurs in an OI project since firms must simultaneously protect their know-how and share some of it (Bogers, 2011). While adopting a defensive approach to IP in a "closed" innovation paradigm is not likely to cause an innovation failure (Grimaldi, Greco and Cricelli, 2021), OI projects can fail when IP exchanges are impeded or when an agreement over IP is missing. An interviewee described the importance of considering IP aspects for OI vividly:

> "[Intellectual property] aspects must be assessed, while they are often overlooked. They determine how the partners will work together and which relationships will bind them at the end of the project. They must be considered at the beginning of the project since they lead to its success or failure" [I19].

IP issues can also cause OI failures when a project is funded by external actors not directly involved in it (e.g., public agencies). For instance, I10 experienced endless negotiations over IP on a UE-funded

project. The expected deliverable of the project was developed; however, it was not commercialised due to the conflicting IP interests of the partners.

The issue of protecting IP is not limited to the firm's knowledge base, which may be reasonably protected with non-disclosure agreements. Indeed, the most difficult negotiations over IP involve the new knowledge base, which is generated collectively. Several interviewees mentioned the importance of deciding who will own the generated IP in advance. For instance, I11 stated:

> "On intellectual property, many projects slip because it is unclear who should be the owner of the generated intellectual property; or, in the end, someone claims the use of knowledge generated before the project, and the legal litigation starts" [I11].

Therefore, a well-conducted OI project leading to a relevant technology may fail if the associated IP is assigned to another partner and the focal firm cannot exploit it.

7 Countermoves to mitigate "bad" OI failures

This section recommends tools that an OI manager should use to mitigate the causes of OI "bad" failures. Table 2 introduces the countermoves discussed in this section, linking them to the domains and causes presented in the previous section.

Table 2. Countermoves to prevent the causes of bad OI failures. Source: Authors own work.

Domain	**Bad failure cause**	**Countermove**
Internal causes of failure	Cultural barriers (e.g., NIHS, behavioural inertia, aversion to change) Lack of OI education Lack of internal coordination	OI training and education program Direct and indirect NIHS countermeasures
Risk management	Poor risk management	Implementing and maintaining a risk management process
Partner selection	Lack of experience/maturity of some partners Over collaborating partners Subjective selection of partners	Choosing and implementing robust screening and selection procedures

Coordination and negotiation	Lack of clear and shared goals and conditions at the start of the collaboration Diverging motivations or interests of the partners (e.g., interest in sharing research results in universities vs corporate) or generations involved Unclear plan of the operations	Plan workshops to prepare project charters
Intellectual property	Conflicts around IP in inter-organisational collaborations	IP strategy, IP protection mechanisms

7.1 OI training and education programs

While some resistance to OI may always remain, the involvement of human resources assigned to OI projects in training and education programs can mitigate it (Burcharth, Knudsen and Søndergaard, 2014; Hannen *et al.*, 2019). Such programs could cover basic knowledge about the different types of OI initiatives (e.g., crowdfunding, hackathons, university-industry collaboration), their peculiarities, and guidelines to manage them fruitfully. In addition, the programs could include specific topics about implementing OI in a firm (e.g., ongoing initiatives, people in charge, strategic goals). Furthermore, the programs can address the motivational challenges hampering OI, such as the NHIS, aversion to change and behavioural inertia (Marzi *et al.*, 2023). Facing these cultural barriers requires a strong communication effort to favour the acceptance of externally developed solutions and clarify that OI projects may differ from the usual course of action. Therefore, training and educational programs should address the cultural barriers impeding OI and provide human resources tools and information to coordinate or contribute to OI projects successfully.

7.2 NIHS countermeasures

The literature suggests several countermeasures to mitigate the NIHS. For instance, Hannen et al. (2019) presented an extensive typology of countermoves. Among them, staff rotation and the inclusion of boundary-spanner individuals (i.e., actors who mediate between project members and external knowledge) in project teams may inhibit detrimental dynamics characterising the NIHS (Cao *et al.*, 2021). Furthermore, incentives, authority and "softer" persuasive attitudes could foster the

desired behaviour. In this vein, Wentz (2024) discussed the benefits of incentivising scientists and rewarding those responsible for externally sourced innovation with both intangible and financial rewards.

Additionally, Hannen et al. (2019) identified other countermeasures to address the bias by increasing objectivity. For instance, setting clear goals and responsibilities for each member, implementing checklists and idea rankings, and tailoring information about external partners might increase objectivity. Hannen et al. (2019) also found that "perspective taking", i.e. the capability of taking the project partner's perspective, is a useful debiasing technique that mitigates the NIHS.

7.3 Implementing and maintaining a risk management process

Creating and maintaining a risk management process is often not a standard approach as it should be. A case in point is creating and maintaining a risk register, a classic tool used in project management to identify, assess, and track risks throughout the project lifecycle (Project Management Institute, 2021). It is a centralised repository for recording and documenting potential risks across projects. The purpose of a risk register is to capture and analyse risks systematically, enabling project managers and stakeholders to make informed decisions and develop appropriate risk response strategies (Chapman and Ward, 2003). By maintaining a comprehensive risk register, project teams can proactively identify and address potential threats and opportunities, maximising the chances of success. Common "fields" in the risk register are risk name/ID, description, assessment (qualitative/quantitative), ownership, mitigation strategy, residual risk assessment (qualitative/quantitative), communication and reporting.

By maintaining a well-structured risk register, managers can enhance the OI project's overall chances of success and enable better decision-making throughout the OI project lifecycle.

7.4 Choosing and implementing robust screening and selection procedures

Firms can use several approaches to implement the screening phase, such as pool-based search, search based on databases, existing networks, big data analyses and open calls for participation (Guertler

and Lindemann, 2016). Although different OI forms may require diverse selection approaches, some common aspects should generally be considered in inter-organisational collaboration: complementarity, similarity/compatibility, trust and proximity. Complementarity describes the extent to which the partner owns tangible and intangible resources that the focal firm needs to innovate. The partner's research skills and technical capabilities should be among the most important selection criteria (Howells, Gagliardi and Malik, 2008). Similarity/compatibility defines the extent to which the partner is close to the focal firm regarding corporate culture and organisation (Russo and Cesarani, 2017), along with some overlap in technological know-how (Messeni Petruzzelli, 2011). The overlap guarantees that the focal firm has the absorptive capacity needed to benefit from the OI project. When organisational similarity is not an option (as in the case of an incumbent large organisation collaborating with startups), a common strategic orientation should at least be considered (de Groote and Backmann, 2020). Trust is an archetypal OI enabler. Indeed, mutual confidence, especially when based on previous collaborations, can foster OI and reduce opportunistic behaviour (Bunduchi, 2013). Yet, our findings show that the decision may also be biased towards neither complementary nor similar partners. Finally, geographical proximity favours fruitful face-to-face interactions and reduces cognitive-cultural distance, fostering knowledge transfer and innovation performance (Audretsch *et al.*, 2023).

Managers could leverage these aspects as selection criteria to assess potential partners. Compensatory models could also be considered, assigning weights and scores according to how complementary, compatible, trustworthy, close, and competent each potential partner is, ultimately choosing the best one. Based on the innovation project and the potential partners, the weights could be determined to ignore specific criteria (e.g., proximity could be sacrificed if neighbouring options are unconvincing, complementarity and compatibility could be ignored if the firm needs access to rare and specific know-how).

7.5 Plan workshops to prepare project charters

While goals are at the heart of any OI project, other information should also be shared and agreed on at the start of the collaboration, such as the expected activities, the tangible and intangible resources used, the responsibilities and the organisational aspects. A project charter considers these aspects (Project Management Institute, 2021). A project charter is a document issued by the project initiator or sponsor, officially endorsing the project's existence and granting the project manager permission to utilise organisational resources for project activities. The charter is established once the project supporters have thoroughly examined the business case, understood the project's elements (as evident in the Statement of Work), and incorporated company-specific details for the project's initiation. The project charter serves as formal company approval, which is only granted when all the necessary information is satisfied during the conceptual development phase. Common fields in the project charter are project title, scope and objectives, overview, defining conditions and constraints, project organisation, project manager responsibilities, and approvals.

While the project charter can effectively deal with inter-organisational collaborations, more peculiar OI projects (e.g., incubating startups, resorting to crowdsourcing or hackathons) would require different courses of action. For example, Blohm et al. (2018) presented four approaches to managing crowdsourcing: micro-tasking, information pooling, broadcast search and open collaboration.

Furthermore, large organisations involved in multiple OI projects should also conceive key performance indicators to assess their progress. These indicators should be scalable to aggregate individual OI projects' performance and evaluate the overarching OI program.

7.6 IP strategy, IP protection mechanisms

The first step for organisations embracing OI is deciding their underlying IP strategy. A firm may either have a strongly defensive IP strategy, entailing a strict approach to preserve their IP, or a more “open” IP strategy, where knowledge spillovers are more likely to happen. While we might intuitively

consider the second approach more likely to enable OI, evidence shows both are valid and viable options (Greco, Cricelli, *et al.*, 2022).

Once the strategy is set, the IP toolkit includes protection mechanisms such as non-disclosure agreements, patents, designs, trade secrets, copyrights and trademarks (Aloini *et al.*, 2017). IP issues will likely happen when the OI project leads to a valuable outcome. Therefore, negotiating over IP at the beginning is wise, particularly over how the project results will be shared.

8 Conclusions

While tolerance towards failure is a mantra for modern companies, this paper advocates that some OI failures deserve less tolerance than others: "bad" OI failures stemming from causes that could be addressed beforehand, saving time and resources. This section summarises the implications for practitioners and scholars of this study, its limitations and potential future research opportunities.

8.1 Implications for practitioners

This paper presents a list of countermoves that could become a guide for OI managers to mitigate the causes of bad OI failures. Countermoves include tackling the internal causes of OI project failure through training programs, assessing the risks of OI projects in advance, searching and selecting the appropriate partners with a structured approach, using solid tools to coordinate OI projects, such as project charters, and choosing IP strategies and protection mechanisms wisely. Notably, even though our interviewees did not highlight issues related to deliberate deviation, inattention, lack of ability or process inadequacy, managers should not lower their guard against these obvious, albeit tricky, causes of "bad failure" of innovation projects.

Additionally, our interviewees mentioned aspects that have received little attention in the OI context. Among them, *time* emerged as a key factor often overlooked in the dichotomy of failure and success. On this matter, OI managers can borrow from the project management various nuances of time, including the risk of the project being delivered late, which increases with the number of participants; the risk that a new technology, successfully developed during an OI project, might not be applied to

the focal firm's portfolio in a feasible time (i.e., the achievement of the scope of the project would not allow benefit realisation); and the possibility that an unsuccessful innovation today could become a success later or that testing a technology too early may compromise the focal firm's commitment to invest in it in the future.

8.2 Implications for scholars

We discussed how very few previous studies focused on OI failure and how they described its determinants without considering its good or bad nature. We contributed to the literature by offering several new ontological insights about the difference between good and bad OI failures. Future studies are encouraged to refine the two categories further. For instance, future research should recognise that "good" OI failures are not to blame and should not be regarded as a proxy for negative performance or leveraged to evaluate which OI practices should be avoided. Indeed, for instance, a study recommending adopting a particular practice to prevent OI failure could be fundamentally flawed if the investigated OI failure is not a "bad" failure.

Another key point for future research is to explore multiple stakeholders' perspectives since a perceived failure for one may be a success for another. Furthermore, some of the causes of failure we identified deserve further investigation. For example, the role of managers as causes of the NIHS rather than actors trying to address it deserves further empirical analysis. Deliberate deviation, inattention, lack of ability or process inadequacy are also rarely discussed in the OI literature: do they actually play a less relevant role in causing OI failure than OI-specific causes such as those discussed in this article? Overall, a micro-foundational analysis of the causes of a "bad" failure could unleash a more in-depth understanding of the phenomenon, particularly if oriented to explore failure not at the OI project level but at the individual level, aiming to grasp the role played by the human factor in triggering or defusing an OI failure.

These considerations also apply to the emerging "closing of OI" literature, which suggests that OI initiatives can - and sometimes should - be terminated without regrets. It would be critical to understand which factors determine an undesirable OI closure (or, as we could call it, a "bad" OI closure) and distinguish them from functional or desirable ones.

Time also has implications for scholars. OI is often considered an innovation process accelerator: under which circumstances would this outcome not happen? How does the notion of OI success vary with different time horizons? To what extent and under which circumstances can a "bad" failure become a "good" one? Can the opposite happen?

8.3 Limitations and future research

This article presented a single case study describing the experience of a multinational company with OI "good" and "bad" failures. Even though its findings often resonate with the extant literature, they cannot be generalised at large. Hence, we encourage future research to study good and bad OI failures in other contexts (e.g., SMEs, low-tech companies, developing and underdeveloped countries) and to exploit other research methods (e.g., quantitative studies, research in action, ethnography).

This article discussed a binary distinction between "good" and "bad" OI failure, whereas a more nuanced understanding of the "shades of grey" between these two extremes could be the goal of future research. Furthermore, our interviewees mostly discussed relatively young OI projects. Future research could address this limitation by conducting longitudinal analyses or studying short-term versus long-term failure appraisal. Last, since labelling an OI project as a failure can be subjective and biases can affect interviewees' interpretation of them (as discussed in section 4.2), we encourage future studies to explore objective failures (i.e., failures defined as such by third parties or specified in terms of commercialisation results).

Appendix

Table A1 – Semi-structured survey (translated in English from the original questions in Italian). Source: Authors own work.

#	Question	Underlying concept
1	What is the difference between an innovation project and an open innovation project?	Common vocabulary
2	Under which circumstances do you define an OI project as unsuccessful?	Common vocabulary
3	Based on your experience, what factors lead to unsuccessful OI projects?	Causes for failure
4	According to your experience, what is the impact of an unsuccessful project on subsequent endeavours (in terms of learning or trauma)?	Failure as a learning tool or trauma
5	Could you describe one unsuccessful OI project you have been involved in?	Eliciting specific memories
6	What caused its failure?	Causes for failure
7	What were the consequences of its failure?	Failure as a learning tool or trauma

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