How to Learn From Failure. Organizational Creativity, Learning, Innovation and the Benefit of Failure

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Abstract

There are many aspects of failure that could be of value to the organization performance. Failures are results that do not confirm previous expectations and show where and how organizations were unable to cope with the external environment. Failure appears to be relevant in driving innovative activity, as it operates as a supplementary element to build the organizational knowledge. The impact of failure on innovative activity might have positive implications, especially once they are considered within a dynamic rather than a static framework.

Failure and its relationships with creativity and learning

Creativity is the mantra of our times. It reflects the importance that learning (at every possible level) has in our society, and the central role that the concept of knowledge-based society has in virtually any policy program. Organizational learning (the literature on this topic is obviously vast, for an early and a late survey see Endnotes 1 and 2) is thus a way through which firms profit in various ways from processes of learning aimed at creativity and innovativeness. Through learning, production processes are revised, redefined and reoriented, by apprehending, refining, modifying and restructuring existing routines and operating procedures.[3]

Organizations are increasingly dependent of their capacity to develop novelty for increasingly hungry and difficult to satiate markets. This implies the crucial need to elaborate conscious processes to organize the stock of preexisting knowledge into qualitatively different forms to develop their

innovative potentials[4] to create and subsequently exploit the new ideas resulting into marketable innovation.[5]

As innovative activity deals with true uncertainty (that is rather different from risk) innovative activity will frequently result in failure. Failure will be likely to result even if the main obstacles to innovation (e.g. high production costs, insufficient human capital endowment, difficulties in accessing the markets, financial barriers and regulatory obstacles, see, for instance Endnote 6) are not considered.

Firms are also subject to the so-called liability of success[7] that can increase the probability to experience failure during their life cycle because of: complacency (that reduces organizations alertness to negative signals following prolonged periods of success), low level of attention (that results from a sort of natural tendency of individuals to trust old and well-known routines) and homogeneity (a successful team is more likely to be sclerotic, as is will most likely not undergo organizational changes).

Failure is therefore usually treated as a notable problem and as such it is a drawback for both organizations and employees. For this reason, failures are frequently leading to downsizing of the activities that are deemed as "responsible," and resources are normally redirected towards less risky alternatives.[8] In this sense, failure provides neither guidelines nor incentives for further creative activities. Moreover, employees that were responsible for a failing innovative project carry over a lower status in case they attempt a transition to subsequent employers.[9]

For these reasons, creative and learning activities are not a usual target for the vast majority of firms. The constant search for successful innovation in production and marketing that is so preached in manuals does not appear to be the "normal" organizational behavior. Firms are normally risk-adverse, and thus rather than targeting bold and risky behavior they seem to be more conservative and more oriented to avoiding failures.[10] Hence, there appear to be very few organizations that are interested in pushing their employees towards creative behaviors and to increase the likelihood that employees could participate in a pro-active manner to the innovative and creative activities without fearing the risk of being stigmatized should they fail.[11,12] Indeed, another viewpoint to this question could be that of seeing failure as one possible and "normal" result of creative exploration, thus enhancing the likelihood that someone else could extract the right idea from someone else's failure.

Failure and its crucial role for innovation

There are many aspects of failure that could be of value to the organization performance. The impact of failure on innovative activity might have positive implications, especially once they are considered within a dynamic rather than a static framework.[13] The most recent literature underlined that failure can have a crucial role in organizational learning, triggering creative answers.[14] As failure "betrays" expectations, a very high degree of alertness and of understanding is needed in order to spot minor failures before they become so paramount to force the innovative project to be shut up.[15] Learning processes that emerge from the attempts to understanding the causes of the failure could give firms a chance to even more radical innovation.[16,17]

Failures are results that do not confirm previous expectations. Their appearance is unexpected and for this reason it requires a higher level of attention especially to previously unnoticed problems. It thus requires a strong capacity to work backward in order to reconstruct the process that led to the "wrong" side of the bifurcation. However, once the process has been implemented, it is easier to understand what went wrong than what will work well. It is easier to recognize weaknesses than strengths (for which it is possible to have only an approximate idea). It is easier to assess criteria for failure, rather than criteria for optimal outcomes.

Failures show where and how organizations were unable to cope with the external environment. From this perspective, the only case in which the organizational routines are thoroughly investigated is when they fail systematically to reproduce a proper interface with the outer environment. Therefore, failure is effective in driving innovative activity because it is a supplementary element to put at use to build the organizational knowledge.

Failures is a detector helping organizations to deal with the techno–economic challenges coming from the unexpected: the investigation of a failed innovative project can produce valuable new knowledge. Firms are more incentivized when their organizational routines are stressed from negative results, and it is usually only in these cases that a thorough investigation is put in motion. Therefore, failure appears to be relevant in driving innovative activity, as it operates as a supplementary element to build the organizational knowledge.

The role of failure has been even reversed, to the point that "intelligent" failure has been theorized: organizations thus learn how to (intelligently) fail. Firms allow free and "undirected" ideas, the "intelligent" failure of which

helps to highlight previously unnoticed problems that can be solved as if they were reproduced in laboratory experiments. This practice is valuable to identify barriers by experimenting in isolated, well delimited, and expected cases. It is possible then to deal with failure and to gain behavioral recommendations for learning.[18-20]

How failure helps to become more innovative

Armed with these theoretical background a host of empirical literature has been produced to show how failure in the end could be considered as another input of the production function of the innovative capacity of the firms. The empirical analysis of the "benefit of failure" has addressed mainly cases of major disasters, as, on the one side, they are more easily observable, and, on the other, they are amenable to more clear policy issues both organizational and political (see for instance the book by Collins & Pinch on the Golem of technology[21]).

A first interesting example is the analysis that Dorfler & Baumann carried out on the "catastrophic" failure of Airbus A380.[22] The development of the wide body jet airliner went to an almost unprecedented halt as an initial "small" problem (due to the wiring system) escalated, because of its interactions with the rest of such a complex production system, to the overall organization of the design and the production process. The result eventually involved the whole production schedule causing a delay in delivery of up to eighteen months, with the collateral of a huge decrease in Airbus share price. As soon as a careful analysis was performed, it was discovered that the process of shifting from "ordinary" to "emergency" behavior is usually done along two dimensions: a top–down ad hoc process and a bottom–up systemic process. The discovery of a "minor" failure was faced through an ad-hoc top–down approach, which seemed quite reasonable, as it targeted an initial and immediate solution to the problems. However, as this ad-hoc strategy failed, it was when a systemic and bottom–up approach to learning was adopted that things started to work properly again: this strategy proved to be the effective trigger to spur the right organizational changes that eventually led the organization outside of the crisis. A similar argument emerges from Haunschild & Sullivan's analysis of airline companies in dealing with failures: also in this case, accidents that resulted from multiple causes spurred careful investigations, the consequence of which was fewer accidents in subsequent periods, with respect to airline companies that turned out to have experienced less complex types of failure.[23]

The most important and spectacular analysis is that of the 2003 Columbia Space Shuttle catastrophic failure.[24,25] In the aftermath of the disaster, NASA established the Columbia Accident Investigation Board that eventually highlighted the relevance of prior near–misses (i.e. small failures that never translated into failure, such as the repeated damages to the O-rings, rubber rings used to seal a joint on the rocket booster, suffered during previous launches) that were almost completely ignored. Just like success, near misses have lower probabilities to produce revisions to the organizational practices.[26] The failure has thus driven an immediate learning process that was effective in highlighting two different elements: minor failure that went overlooked and innovative procedures to be implemented for the next missions.

Finally, it must be noted that this literature focuses only on case studies and spectacular failures that can be used for theory building and policy advice. However, recently, Leoncini has shown that failure can be analyzed also within a more extensive domain, that is, the almost 100.000 firms participating to the 2008 European Community Innovation Survey.[27] By means of a two-step econometric model the article shows that failure is negatively correlated to the firms' experience (proxies by R&D) and to the acquisition of direct and indirect (vicarious) external knowledge. More interestingly, the second step reveals that failure in turn has a positive impact on performance in terms of percentage of turnover from new to the market innovative products. Basically, it shows that the idea that failed innovative activity positively impacts organizations innovation is far from absurd. Learning therefore seems to be stimulated if organizational routines are stressed by consistent failures. Failure thus can become an important element to trigger innovative activity, acting as a supplementary means to further build organizational knowledge.

The policy implications of these results can be highlighted from different points of view. First, failure is not a negative element. Focusing the analysis only on the possible barriers to innovation as the sole target of policies aiming to remedy for market failures (thus enabling society to rip the full benefit from innovation) misses the other side of the story and forbids firms to rip the benefit of failure. Second, policies should target more the intangible barriers implied by the stigmatization of failure (that comes directly from the early educational activities that highly prize success and condemn failure): failure should be seen not as a drawback but as an opportunity to improve the organization's knowledge stock. Third, attention to the experiences of

others should focus more on how they deal with difficulties than on their successes: the accumulation of a stock of knowledge from both successes and failures, both from direct investments in innovative activity and from networking efforts, should be encouraged and ought to be the target of direct policy interventions.

Author

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Endnotes

1. Huber, G.P. (1991). Organizational learning: The contributing processes and the literatures. *Organization Science, 2*(1), 88-115.
2. Argote, L. & Miron-Spektor, E. (2011). Organizational learning: From experience to knowledge. *Organization Science, 22*(5), 1123-1137.
3. Cyert, R.M., & March J.G. (1963). *A Behavioral Theory of the Firm.* Englewood Cliffs, NJ: Prentice-Hall.
4. Levitt, B. & March J. (1988). Organizational learning. *Annual Review of Sociology, 14*, 319–340.
5. Schumpeter, J.A. (1934). *The Theory of Economic Development.* Cambridge, MA: Harvard University Press.
6. D'Este, P., Rentocchini, F. & Vega-Jurado, J. (2014). The role of human capital in lowering the barriers to engaging in innovation. Evidence from the Spanish innovation survey. *Industry and Innovation, 21*(1), 1-19.
7. Sitkin, S.B. (1992). Learning through failure: The strategy of small losses. *Research in Organizational Behavior, 14*, 231-266.
8. Eggers, J.P. (2012). Falling flat: Failed technologies and investment under uncertainty. *Administrative Science Quarterly, 57*(1), 47-80.
9. Rider, C.I. & Negro, G. (2015). Organizational failure and intraprofessional status loss. *Organization Science, 26*(3), 633-649.
10. Tahirsylaj, A.S. (2012). Stimulating creativity and innovation through Intelligent Fast Failure. *Thinking Skills and Creativity, 7*(3), 265-270.
11. Shepherd, D.A. (2003). Learning from business failure: Propositions of grief recovery for the self-employed. *Academy of Management Review, 28*(2), 318-328.

12. Shepherd, D.A. & Cardon, M.S. (2009). Negative emotional reactions to project failure and the self-compassion to learn from the experience. *Journal of Management Studies, 46*(6), 923-949.
13. Townsend, W.R. (2010). Innovation and the value of failure. *International Journal of Management and Marketing Research, 3*(1), 75-84.
14. Coe, R.M. & Barnhill, E.A. (1967). Social dimensions of failure in innovation. *Human Organization, 26*, 149–156.
15. Dorfler, I. & Baumann, O. (2014). Learning from a drastic failure: The case of the Airbus A380 program. *Industry and Innovation, 21*(3), 197–214.
16. Haunschild, P.R. & Sullivan, B. (2002). Learning from complexity: Effects of prior accidents and incidents on airlines learning. *Administrative Science Quarterly, 47*(4), 609–643.
17. Madsen, P.M. & Desai, V. (2010). Failing to learn? The effect of failure and success on organizational learning in the global orbital launch vehicle industry. *Academy of Management Journal, 53*(3), 451–476.
18. Cannon, M.D. & Edmondson, A.C. (2005). Failing to learn and learning to fail (intelligently): How great organizations put failure to work to innovate and improve. *Long Range Planning, 38*, 299-319.
19. Tahirsylaj, A.S. (2012). Stimulating creativity and innovation through Intelligent Fast Failure. *Thinking Skills and Creativity, 7*(3), 265-270.
20. Sitkin, S.B. (1992). Learning through failure: The strategy of small losses. *Research in Organizational Behavior, 14*, 231-266.
21. Collins, H. & Pinch, T. (1998). *The Golem at Large. What You Should Know about Technology.* Cambridge, UK: Cambridge University Press.
22. Dorfler, I. & Baumann, O. (2014). Learning from a drastic failure: The case of the Airbus A380 program. *Industry and Innovation, 21*(3), 197–214.
23. Haunschild, P.R. & Sullivan, B. (2002). Learning from complexity: Effects of prior accidents and incidents on airlines learning. *Administrative Science Quarterly, 47*(4), 609–643.
24. Collins, H. & Pinch, T. (1998). *The Golem at Large. What You Should Know about Technology.* Cambridge, UK: Cambridge University Press.
25. Madsen, P.M. & Desai, V. (2010). Failing to learn? The effect of failure and success on organizational learning in the global orbital launch vehicle industry. *Academy of Management Journal, 53*(3), 451–476.
26. Dillon, R.L. & Tinsley, C.H. (2008). How near-misses influence decision making under risk: A missed opportunity for learning. *Management Science, 54*(8), 1425–1440.
27. Leoncini, R. (2016). Learning-by-failing. An empirical exercise on CIS data. *Research Policy, 45*(2), 376–386.