

# Fix me a glitch

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## Valorization addendum

Following the emergence and global expansion of new players in Asia and Latin America during the first decade of the 21st century, incumbent manufacturers began facing increased cost-cutting pressures in an environment suddenly defined by over-capacity and rising commoditization (McKinsey Global Institute, 2017). The relentless pursuit of efficiencies inspired many manufacturers in advanced economies to search for higher profit margins in so-called niche markets where differentiation depends on technical superiority and customization (Marsh, 2012). This is the case for example of Cochlear, Australian manufacturer of tailor-made hear implants, or of Dell the American PC manufacturer. These manufacturers tried to increase the value added of their product offerings by catering to customers' increasingly personalized requirements, while committing to speed and quality targets akin to high-volume environments (Gosling and Naim, 2009). Such ambitious strategic positioning is associated with significant operational challenges. Custom manufacturers must manage the uncertainties inherent in product development projects yet still adhere to scrupulous delivery schedules and quality standards. This is the operational environment faced by many manufacturers in Limburg, a region primarily characterized by hi-tech products integrated in the value-chains of the automotive, aviation and medical industries (ESIC, 2013). In this type of ecosystem, customers of custom manufacturers expect the provision of highly reliable products in increasingly short lead times (Hagel III et al. 2015).

Such a tough competitive context encourages custom manufacturers to continuously expand their product offerings, which ends up introducing rising complexity in their operations (Caniato and Groessler, 2015; Roh et al. 2014). This extra complexity is mainly engendered by a proliferation of parts, components, sub-assemblies and interfaces, which poses considerable risks to product development processes (Jacobs et al. 2007). One of these risks pertains to the occurrence of errors, problems or disruptions that were unanticipated by production planners; yet must, nevertheless, be addressed. This dissertation labels these unanticipated issues as operational glitches and the activities performed to address them as glitch mitigation activities. The dissertation evidences that operational glitches negatively affect performance, that custom manufacturers can – to an extent! – soften that impact and, furthermore, that it is possible to improve one's ability to deal with this type of disruption. In this section, I discuss the implications of the empirical studies comprising this dissertation for managers and employees.

## **Chapter 2: Mitigating the Impact of Transactive Memory Systems on External Quality Failures**

This chapter provides ETO manufacturers with insights on how to improve their quality performance. From a risk management perspective, results from the Business Continuity Institute annual survey consistently show that product defects and customer complaints are a major concern for manufacturing executives (BCI, 2015; 2016; 2017). The findings of

this chapter statistically validate these concerns by revealing a negative association between different types of operational glitches and external quality performance. This implies that manufacturers have to be extremely alert to prevent glitches that manifest internally from turning into product failures in the hands of customers. Furthermore, for the firms in our sample the incidence of external quality failures relates negatively to profitability, which offers additional substantiation to these managerial concerns. Specifically, the findings of this chapter help ETO manufacturers to identify critical drivers of the incidence of product defects, which is an important first step towards preventing their occurrence. In this sense, our findings make clear that accepting customer change orders, incurring in design errors and producing nonconforming products affects ETO manufacturers' ability to ship products devoid of quality problems to their customers. This should alert managers and employees of ETO manufacturers towards the quality risk inherent to the occurrence of these operational glitches and stimulate the allocation of resources towards decreasing it. In particular, ETO manufacturers should determine what set of their customer base is relatively more willing to accept delivery failures and what set is more willing to accept quality failures. This will enable them to allocate glitch mitigation resources more efficiently and to enhance the likelihood of shipping fault-free products, by, for instances, devoting extra time to properly fix operational glitches in orders whose customers are more sensitive to quality failures.

In any case, this chapter also establishes that the extent to which frontline employees exchange expert knowledge among themselves while engaging in glitch mitigation activities reduces the incidence of external quality failures. This finding offers ETO manufacturers guidance on how to cope with hard-to-avoid operational glitches. Namely, managers of these firms should do their utmost to stimulate the exchange of knowledge between personnel in different departments to increase the likelihood of coming up with effective responses to operational glitches. In order to do this, managers should devise policies that encourage employees to make their own expertise salient and that breed mutual confidence in the expertise levels of different specialist throughout the firm. This means, for example, maintaining informative and up-to-date organizational charts that not only reveal everyone's areas of expertise but also generate confidence by disclosing levels of education and types of formal certifications held. By using and integrating the unique expertise of employees scattered around the organization, ETO manufacturers are better able to ship products devoid of any quality defect.

### **Chapter 3: Organizational and Individual Antecedents to Inter-functional Glitch Mitigation Transactive Memory Systems**

This chapter addresses a critical issue for manufacturers in general and ETO manufacturers in particular: developing inter-departmental knowledge exchange habits during moments of operational crisis. Even though there is good evidence that ETO manufacturers are more

resilient to the occurrence of operational glitches if their response integrates relevant expertise from different functions, there is little guidance on how to actually achieve this. This chapter identifies three actions that ETO manufacturers can take to boost employees' knowledge exchange prowess as they engage in glitch mitigation activities. Firstly, it is important that manufacturers set firm-level goals while eschewing the use of departmental-level goals. In other words, these manufacturers would do well to implement compensation schemes that reward inter-functional cooperation. Such schemes provide employees with the necessary motivation to seek and give advice across departmental boundaries. Secondly, this chapter finds that ETO manufacturers should strive to develop and maintain informative job descriptions and organizational charts to help personnel create a mental map of who in the firm is likely to be an expert on what issues, topics and fields. This enables employees to quickly identify who can be in possession of what type of useful expertise. Thirdly, these firms must not shy away from creating boundary-spanning roles, such as project managers. These positions will not only serve to directly coordinate work in relation to specific orders, but will also develop individuals with the ability to point seekers of relevant knowledge towards relevant knowledge holders. Thus, if an employee is searching for a particular kind of information the presence of people with project management experience makes it more likely that the search is effective.

This chapter also identifies two personal characteristics of individuals heading the manufacturing department that influence the extent to which employees engage in inter-functional knowledge exchanges while engaged in glitch mitigation activities. Our findings demonstrate that if these individuals have personal relationships with a vast array of employees, independently of their role or departmental affiliation, they are more likely to stimulate the development of knowledge exchange behaviors. This means that manufacturers should adopt human resource selection practices that assess how organizationally connected individuals competing for these positions are. In addition, this also means that these firms should invest resources in enhancing the personal network of individuals occupying such a position by, for instances, holding regular recreational events or designing office spaces conducive to socialization. However, our findings also make clear that if these individuals have rotated in other departments before becoming Heads of Manufacturing they might have a damaging effect on subordinates' motivation towards engaging in knowledge exchanges beyond departmental boundaries. This is because their subordinates will tend to think that Heads of Manufacturing with experience in other departments are already in possession of all the required expertise. Hence, to the extent that ETO manufacturers wish to stimulate the opposite behavior, they should select individuals for Head of Manufacturing positions who have not spent a great deal of time working in other functions.

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