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# **Affordance Theory for Information Systems project implementation: a process and organizational outlook.**

*Completed Research Full Paper*

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## **Abstract**

*This paper explores the Information Systems project implementations in organizations. It focuses on the actualization of the affordances that result from the intertwining of the Information Technology (IT) artefact and the organization and we answer to the following research question “How do organizations actualize affordances?” With a qualitative multiple case study on the different local entities of an international leading retailer, this research identifies that previous research omitted the top management sponsorship as one of the main influences for the actualization process. Moreover, constrains perception is observed in the collected data and its role is assessed. This paper contributes the development of the affordance theory by providing an updated process-based integrative theoretical framework for affordances at the organizational level, aimed to support further research on Information Systems.*

## **Keywords**

Multiple Case Study, Affordance Theory, Affordance Actualization, Affordance Effect, Multinational Corporation.

## **Introduction**

Affordance theory, applied to IS, has recently been seen as increasingly relevant and has attracted growing interest from scholars. There is a general agreement that an affordance is a goal-oriented potential of action which originates from an actor and artefact relationship (Markus & Silver, 2008; Strong et al., 2014; Zammuto et al., 2007). The introduction of the organization, as a human collective that can likewise engage in a relationship with the IT artefact (Zammuto et al., 2007), raises the possibility of applying affordance theory to IS. If this affordance is perceived by the organization, it can be enacted to generate an outcome. This process of consciously enacting an affordance is called affordance actualization (Strong et al., 2014). Once an affordance is actualized, it can cause an outcome, the affordance effect (Bernhard et al., 2013; Glowalla et al., 2014; Pozzi et al., 2014). The affordance actualization becomes an element of great relevance of affordance theory as applied to IS, as it explains the process through which a perceived affordance can be enacted and generate an outcome. Scholars have called for further research on this actualization concept (Strong et al., 2014). Shedding light on how this actualization concept unfolds can both support the progress of the theory and, potentially, improve practitioners’ tools and understanding to enable them to manage IS project implementations more successfully. Furthermore, it is the only step where the organization, consciously and in a goal-oriented manner, decides to trigger an affordance.

Considering previous thoughts on affordance theory and the affordance actualization process, we can phrase our research question thus: “How do organizations actualize affordances?” This actualization

process, if controlled or, at least, identified, could be used by practitioners to improve IS implementation success. This research question both allows the assessment of the original problem statement and opens a door for further theoretical contributions to affordance theory. To answer it, we continue the development of a process-based theoretical framework under the affordance theory lens by conducting a qualitative multiple case study on an international retail organization. The rest of the paper is structured as follows. First a theoretical framework is presented as result of our literature review. In the methodology section the reasoning for our qualitative case study methodology follows. The results of applying that methodology are presented in the findings section. Those results are theoretically discussed in the discussion section where a new proposal of framework is introduced as our main contribution. The conclusion section presents a summary of our research and its highlights.

## **Theoretical Framework**

An affordance is a theoretical construct originally developed in ecological psychology (Gibson, 1977, 1986) that describes as a possibility of action result of the interaction of an actor and an artefact. This relational nature was first intended from an individual (animal or human) level perspective. Applied in numerous fields, affordance theory was brought into the Information Technology domain (Hutchby, 2001) to address the actor and technology (the artefact) relationship and the resulting affordances and constraints. Due to its relational nature, applying affordance theory on IS enables the study of IS implementations beyond the mere set of functionalities than an artefact has.

IS scholars describe affordances as the possibilities for goal-directed action provided by an object in relation to a goal-oriented actor (Markus & Silver, 2008; Strong et al., 2014; Zammuto et al., 2007). Those affordances can be perceived by the actor, and potentially triggered -a process called actualization (Strong et al., 2014). The actualization process can be described as the course in which an individual perceives an affordance and applies it into an activity, resulting the original affordance actualized (Volkoff & Strong, 2013). An affordance can also exist at an organizational level, from its existence to actualization (Zammuto et al., 2007). We use the word 'organization' to refer to the human collective which relates to the same IT artefact, in contrast to the individual actor, consistently with recent IS studies (Leonardi, 2013; Pozzi et al., 2014; Strong et al., 2014). This particular distinction between individual and organizational levels has great relevance for our work. Affordances, at the individual actor level, can be juxtaposed and aggregated for the benefit of an organization. At the same time, new affordances which were not present or perceived at the individual level can emerge at the organization level (Deng & Joshi, 2016). Complementarily, a process perspective becomes pregnant at the organizational level as far more individual actors are expected to contribute to the affordance perception and actualization, ultimately with different roles and at different points in time.

The relationship between artefact and actor not only causes affordances but also constraints or tensions (Glowalla et al., 2014; Jacobson, 2016; Majchrzak & Markus, 2012), which are also considered a relational concept. Tension, in the sense of the difficulty of actualizing an affordance, is identified in the affordance potency process (Anderson & Robey, 2017) and reflects the degree of difficulty for an affordance to be actualized. The affordance potency concept, based on Strong et al.'s (2014) approach to affordance actualization, brings us to include the actual user abilities and the implemented system features as enablers or constraints for an individual affordance actualization. Complementary, Dulipovici and Vieru (2015) apply two theoretical frameworks (sociomaterial practice perspective and social representations) to study the interplays between user perceptions and material properties of an implemented collaboration technology within an organization. They offer a process model for the use of collaboration technologies, where openness to change shape their interpretation of reality and condition the outcome of the implemented technology. Further developing the work from previous scholars (Bernhard et al., 2013; Pozzi et al., 2014), Pérez and Vitari (2020) integrated those insights in a process-based framework for affordances that continued the work from previous scholars, structured sequentially into the following four steps. The cognition step, covering the emergence of the affordances (and constrains) from the intertwining of IT artefact and Organization. The recognition step, where an affordance is perceived by the organization. The Affordance actualization, the enacting of an affordance by the organization. The last step, the effect is the result for the organization of the aforementioned actualization of the affordance. This framework will be the theoretical basis for this research with the aim of extending it.

## Methodology

The capability of qualitative research to explain why a phenomenon happens (Gray, 2014) was the main reason why the qualitative methodology was chosen, as it fitted the exploratory nature of the research question. Moreover, the potential of using multiple data types collected from different sources (Goldkuhl, 2019) that qualitative methods provide was also a decisive factor on the method decision. The methodology chosen is a qualitative multiple case study. The value of case studies lies in the detail at which the observed phenomena can be studied (Palvia et al. 2003). To explore the actualization process and its influences, as well as the constructs and relationships from the updated affordances theoretical framework, the case study is a suitable methodology.

This research studied a CRM-big data project while it was being internationally implemented by one of the leaders in European retail. This multinational corporation has several subsidiary national companies in which the project was being implemented. The conceptualization, implementation, and development of the CRM-big data project was executed by a third company, a startup funded by the multinational corporation to develop this project. In this multiple case study approach, the unit of analysis is each national subsidiary of the multinational corporation. Each national subsidiary is called a “business unit” and coded with a number for anonymity. The CRM-big data project is designed to offer the possibility of creating a digital loyalty program for the multinational corporation. From a technical point of view, the solution is structured around three components. First, a smartphone application managed by a cloud third party software. This application allows the customers to identify themselves in the tills (via QR code) of the stores owned by the subsidiary. It also contains offers, services and promotions with third companies which the customers can only benefit from using the smartphone application. The second component is the Big Data storage system. It is hosted by a leading cloud platform. The third and final component is the Business intelligence solution. This component is set up by a series of dashboards, on which the national subsidiary employees can analyse and export information for insights generation from the national level down to the single customers or products.

The current study used different qualitative data sources, with semi-structured interviews being the main data collection vehicle. It was complemented by data collected through observation and internal data from the organization (internal presentations, training materials for employees and KPI figures). 18 semi-structured interviews were performed, 13 with middle managers (non-executive roles) and employees, at least a middle manager and employee per business unit. An additional four interviews were carried out with international HQ employees and a single interview with an employee from a fifth subsidiary to provide extra context to the research. All managers and employees were part of the teams in charge of the project implementation and solution operation. The company, loyalty plan, apps and interviewees names are anonymized in the following sections with generic names written with capital letters.

## Findings

The findings are presented following the order of the process-based steps of the theoretical framework, ensuring a comprehensive review of the evidences supporting each construct and relationship, identifying as well new constructs that emerge from the collected data.

### **Cognition**

The cognition step of the updated affordances theoretical framework has three independent constructs: the IT artefact, the organization, and the affordance existence.

The IT artefact is clearly identified in Business Units 1, 2, and 4. Its strategic value, big data, and commercial potential are pointed out. That knowledge about the artefact can be perceived in the description by the manager 2 in business unit 1 “*the tool allows us to know what does our customer buy, what does he likes, in which conditions he interacts, what communications he opens, clicks...*”. The IT artefact is perceived as the individual construct that will be implemented in the organization: the sum of all the systems and technologies that support the customer loyalty project.

The organization construct appears clearly in all the business units. Business Units 1, 3, and 4 are described as following a common pattern of conservativeness, rather than being digital- or customer-

oriented. Also, Business Units 2 and 4 share a common perception of the organization being constrained by the international HQ, which limits the local freedom of action. A relevant difference among the organizations was their expectations of or rationale for the project implementation within their business units. Business Unit 1 had very high expectations of the implementation for business intelligence- and commercial- driven features, as explained by the manager 1 from the Business Unit *“we were not oriented to the customer because of the deficit regarding on how we usually approach the customer (...) we don't even have a department in the company focused on the customer”*. Business Unit 2, on the other hand, is more focused on the omnichannel possibilities of the project and regrets the lack of features implemented within it and the inflexible approach from the international HQ to provide them. As described by the manager 2 of the Business Unit:

*“From a strategic perspective we need to look at our international counterparts on how they want us to address retail. We, as a department, are responsible for the correct implementation of those strategic ideas into the local organization, the local entity”*

The affordances existence construct is the result of the intertwining of the IT artefact and the organization. In all the business units, we observed the emergence of the affordances from that relationship. For example, what we named the app-driven commercial activation affordance and the data-driven knowledge acquisition affordance emerged from the IT artefact and organization relationship in Business Units 1, 3, and 4.

*“I think overall obviously the point of this is to drive turnover, increase basket share, grow market share and all of these top line KPIs that we have. But from more personal level I find it more interesting to figure out who our customers are and what they are interested in and what they buy and how we can reward them for that” - Employee 1, Business Unit 4*

The IT artefact supports the possibility of providing the customers with a digital loyalty card as well as the feature of redeeming discounts at the till and the possibility to collect information from the user. The sum of those features, as well as the strategic needs of the business units to fill up this gap on their loyalty, drives the emergence of those affordances.

Likewise affordances, also constraints result from the IT artefact and organization relationship. The manager from Business Unit 4 illustrates the emergence of a constraint *“I think the weakness in the whole understanding in the systems is probably being the customer service, the customer care side (...)I think it was more a bit just happens so fast, the preparation wasn't there you learn through doing, but I just think it was the pressure that the teams were put under that was the barrier for us.”* The disruption caused by the organization and IT artefact intertwining cause problems at customer support level on their organization. Constraints have been observed in all four business units.

We observed in the four business units that the affordance existence construct is consistent with the definition in the theoretical framework, as the central element of the cognition step for an updated affordances theoretical framework.

## **Recognition**

The recognition step has the affordance perception as central element. It is also clearly perceptible in the data collected from all four business units. It is connected by the temporal-causal relationship to the preceding affordance existence, as an affordance cannot be perceived unless it exists first. The manager of the Business Unit 3 describes the need to perceive existing affordances by the different levels of the organization:

*“At the beginning, or more or less right now still in the management level, they only see the project as a new channel, something like leaflet or new kind of new model of the leaflet. Understanding the capacity of the CRM concept in the manager level needs more time to understand the 100% of the capacity”*

The affordances perceived varied across organizations. As an example the employee 1 from the Business Unit 4 describes the unexpected perceived affordance of breaking knowledge silos *“I think the eventual idea I assume would be to sort of align different departments and teams and sort of goals within the*

organization using that CRM software". The teams in the organization started to collaborate through and because of the implemented project.

However an unexpected construct emerges from the data, what we named the constraint perception. This construct represents the process whereby an existing constraint is observed and identified as such by the organization. From the multiple case studies undertaken for the research, this construct can be observed from the analysis of the collected data on all business units. For example in Business Unit 1, the organization is aware of the potential risk associated with the business model detachment constraint, which is described by the manager 1:

*"The risk of the project is that once we listen to the customer and we know their needs we have to evaluate if we are able to satisfy them with a return which can sustain our business model, this is a risk that we have to be able to manage, because it can detach us from our business model"*

The organization knows that wrongful use of customer data or mistaken analysis may lead to wrong decision-taking and potential harm to their operations and market share.

It can be concluded that the results of the analysis of the collected data are aligned with the expected constructs on the recognition step, while a construct emerged from this data that needs to be theoretically assessed.

### **Behaviour**

The behaviour step has as a central element the affordance actualization construct. This construct receives three influences: actual user abilities, implemented system features, and openness to change. The affordance actualization construct is connected through a temporal-causal relationship with the preceding affordance perception and the subsequent affordance effect constructs. In the analyzed data, we can observe that the connection between perception and actualization lies in the goal-oriented attitude to enact those perceived affordances. This will trigger the actualization that makes the relationship tangible. The previous affordance perception construct is a prerequisite for the actualization to happen, as an organization cannot actualize an affordance that has not been perceived.

An example of an actualized affordance from Business Unit 4 illustrates how the organization, after perceiving an existing affordance, decides to enact it (as a goal-oriented action) and allocates resources to that end:

*"We needed to make sure what we did inside the app could be like supply chain, promotions, instore... everyone could manage through the line, so we make decisions based on (...) making sure that whatever we do in the app it was realistic."* (Manager)

To discuss this process, we should focus first on the several influences on the affordance actualization.

Actual user abilities influence the affordance actualization construct among the implemented system features and openness to change influences. The actual user abilities account for the skills and expertise of the human actors who interact with the implemented system features in actualizing the affordances. The manager 2 of the Business Unit 2 describes the situation on his organization:

*"Well I think in some departments (...) are very qualified because they use to work with this kind of numbers, analyses and the dashboards mainly that we have (...). So on that part I think we are very qualified for that. Then we have the people that work (...)so that part I am not really 100% sure if the person that does it right now is totally qualified to be honest."*

The overall conclusion as regards the four business units is that, in these cases, actual user abilities exert a positive influence on the actualization process.

The qualification of the users is discussed at three different levels: first, their knowledge of how to use the implemented CRM tools of the project; second, their professional skill set as business practitioners; and third, how qualified they are in terms of how the organization works and its internal dynamics. The general outcome of this influence on the four business units is that it exerted a positive influence on the affordances actualization, which is consistent with the role of this influence in the update affordances theoretical framework for the actual user abilities influence.

The implemented system features' influence on the affordance actualization construct is based on the fact that the IT artefact and implemented system features in the organization can be different, as not all features or properties of an IT artefact can be or are effectively implemented. The set of features actually implemented can, therefore, influence the affordance actualization process. Having implemented the features that support the actualization can be a key factor; hence, they become an influence on that construct.

In all four business units, the influence of implemented system features was detected, with different outcomes. In Business Units 1 and 2, the lack of several features is considered a negative influence on the actualization of several affordances. The manager 2 of the Business Unit 1 describes it as *"Many times it's what we are able to do what defines what we are going to do"*. This particular constraint is not detected in Business Units 3 and 4, where, in general, the implemented system features are considered a positive influence on the actualization, as explained by the manager from Business Unit 3 *"For example we can have certain activities with very, very short lead up times. A clear advantage for example is that we can reduce overstock situations"*. Across the business units, we have observed how the implemented system features act as limiting or supporting influences on the affordance actualization construct.

The openness to change influence embodies the general attitude of the employees in the organization towards the implementation of new tools and processes, resulting in the enacting of new affordances. In Business Units 2, 3, and 4, the employees generally embraced the project, and resistance was located only in selected departments or individuals, either because of the extra work that it caused them or because they did not grasp the strategic value of the affordances. This can be observed on the remarks from the Business Unit 3 manager:

*"We had and still have people with doubts who don't really see the big picture at this moment, but I would say the majority saw the value of this from a very early stage on and was fairly supportive when it comes to this, unless it had big changes within processes that have been up and running for quite a long time"*.

In contrast, Business Unit 1 shows a higher degree of resistance due to a more conservative attitude across the organization.

We have observed in our analysis that the openness to change influence of the updated affordances theoretical framework is consistent with our results. We observe how the degree of willingness to implement the project and support the affordance actualization exerts an influence, positive or negative, on the actual affordance actualization construct.

The affordance actualization construct is the central element in the behaviour step in the updated affordances theoretical framework. The construct embodies the process whereby an existing and perceived affordance is consciously enacted by the organization to meet an immediate and concrete goal. In this construct, we observe the biggest difference between business units; in contrast with Business Unit 1, in Business Units 2, 3, and 4, the affordances are fully actualized and perceived as such. The main reason for the failure to fully actualize affordances in Business Unit 1 can be found, as observed before, in the unfinished status of the implemented system features or the lack of some such features at the time of the study. In Business Units 2, 3, and 4, we can observe an actualization process aligned with what the affordance actualization construct embodies. The organizations perceived some of the existing affordances and decided to enact them by consciously triggering the actualization process.

For example, in Business Unit 2 the organization built up a segmented strategy to complement its offline and non-segmented online strategies and tasked another department to execute that strategy and a second one to measure the results achieved towards their goals:

*"How are we going to use customer journeys, how are we going to set up the first cases, how are we going to do micromarketing, how are we making sure that it is integrated on every communication aspect within our organization meaning that LOYALTYAPP is not an island, it is a tool, and LOYALTYAPP is one of the tools in our toolbox that we need to use"*. (Manager 1).

By doing so, the organization allocated resources and defined responsibilities to ensure this actualization process took place.

A final construct emerged from the collected data, which we named top management sponsorship. This construct expresses the influence that top management has on the actualization affordance process. This influence was observed in Business Units 2, 3, and 4. For example in Business Unit 2:

*“In our company the culture is sometimes a little bit more top down than in other companies, therefore it is very clear that when a decision is being made on the board level then it has to be done anyways so there is no real discussion about whether or not something makes sense on the employee level. So, therefore even if someone is even reluctant everything has been implemented swiftly.” (Manager)*

They recognize that their board’s support was a critical factor in the actualization of the affordances as it facilitated the commitment of the resources and employees necessary for this process to take place. On internal documentation of the same Business Unit 2 we observed the support of the top management on the allocation of specific budget to create a marketing campaign that promoted the loyalty app towards their customers.

The results of the four case studies support the updated affordances theoretical framework’s affordance actualization construct. Throughout all the business units, we were able to identify this actualization process as well as the fact that it can only be consciously triggered (goal-oriented process) and is placed between the perception of an affordance and the effects of triggering it. Additionally, the top management influence on the actualization process emerged from the collected data, which needs to be addressed from a theoretical perspective.

## **Outcome**

The final step of the updated affordances theoretical framework is the outcome step. It has as a central element the affordance effect construct and also includes the temporal-causal relationship that connects the affordance effect with the preceding affordance actualization construct. We observe that the actualization of an affordance is necessary to trigger an effect; without the enactment of the affordance nothing is triggered.

We can identify different results from the analyzed data on the four business units regarding affordance effects. Business Units 1 and 2 share the fact that they have not yet managed to generate an outcome from the affordance actualization while in Business Units 3 and 4 affordance effects were detected *“From the visit frequency to the pushing the uplift of specific products... yes we have very clear results”* (employee from Business Unit 3). This Business Unit had detected specific effects from the actualization of an affordance related to commercial activation in the form of increase of sales of specific products, which would be a short-term effect. At the same time, however, the organization considered that it was not yet achieving long-term goals as a result of the affordances actualization, which, in this particular case, would be to achieve an increase in market share.

The employee 2 of the Business Unit 4 pointed out the increase of sales as the main effect of actualizing an affordance related to commercial activation of customers:

*“More customers are coming to the stores, they are spending more money if they are choosing where to go to shop and if they spend more in COMPANY this month then they are going to get a coupon the next month, then of course they are choosing COMPANY. That’s the main outcome to the brand.”*

Also, the business unit identified the gathering of knowledge about its customers to support decisions as an effect from a knowledge acquisition affordance:

*“We never really proper knew our customers, because you do different types of research but now it is like in a snapshot we can see the different ages of shopping you know, whether it is male or it is female, like we can see so much straight away, we can see the cart, who is the people that’s buying more into... it’s just that you can see the people’s shopping habits and (...) I do think it brings so much more value to the business, like data rich that’s what everyone needs and it’s crazy to think that so long we never had access.” (manager).*

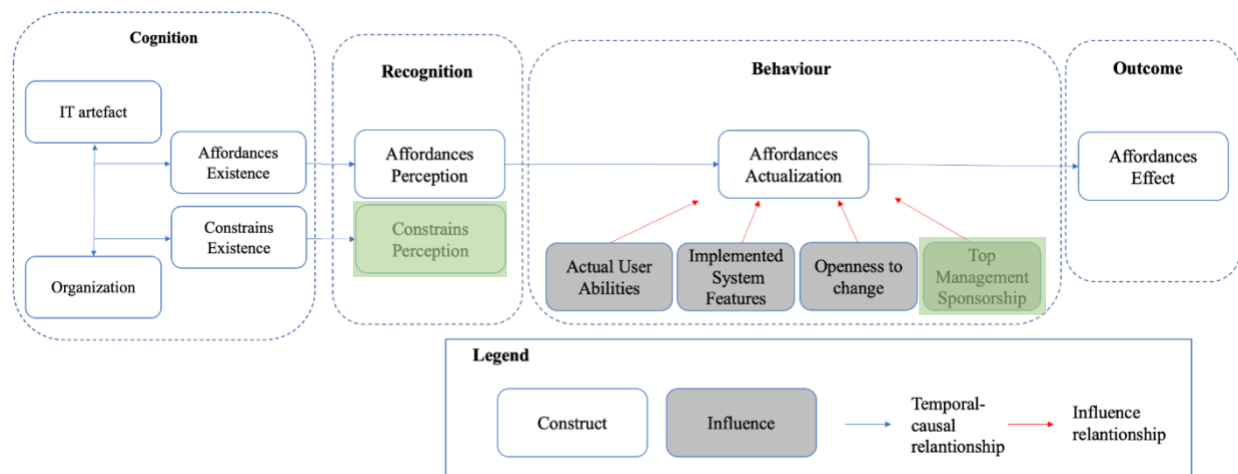


The combination of both affordance effects also offers a mid- and long-term potential effect: the possibility of sustaining the loyalty program on the actualization of those two affordances by collecting information from customers and using it to tailor an attractive personalized proposal.

The collected and analysed data from the case studies on the affordance effect construct offers the vision of a construct aligned with the description in the updated affordances theoretical framework. The effects can be short-term or take longer to appear; both cases were present in the results of the business units.

## Discussions

To address the research question “*How do organization actualize affordances*”, we have applied an existing theoretical framework on affordances (Perez and Vitari, 2020) to explain how an IS artefact is implemented in an organization and which influence factors the organization needs to take account of. The findings from this research, confirming the theoretical framework with the collected data, also showed that this theoretical framework lacked two components to be complete: constrains perception and top management sponsorship.



**Figure 1 – Proposal for an Updated Affordances Theoretical Framework. Highlighted in green, the new additions.**

First, the application of Perez and Vitari (2020) process-based framework for affordances into our research resulted in the confirmation of all constructs of the model. Each individual construct has been observed and identified in our analysis of the collected data.

Second, the constraint perception construct has been included into the recognition step. In contrast with the constraint existence construct, the constraint perception has not been previously addressed in the literature, with the exception of the work of Glowalla et al. (2014) and Effah et al. (2021). This work brings the constraints to the same level as affordances and includes a constraint perception step parallel to affordance perception. The addition of that construct symbolizes that the perception process, being able to observe an existing constraint, is a necessary step, and one differentiated from the single existence of the constraints by the action of the organization. The placement of the construct within the recognition step also illustrates the process-based approach: a constraint needs to exist before it is perceived by the organization and, as stated previously, can do so. The differentiation between existence and perception denotes this separation and order, as well as the need for the organization to actively and consciously observe the potential risk caused by the IT artefact and organization.

Third, the top management sponsorship influence has been added to the behaviour step of the theoretical framework. This embodies the actual impact that having or not having the support of top management (CEO, board members, etc.) has for an organization at the time of enacting an affordance. The results show that this influence has a relevant impact on the actualization process, and it has been identified as a critical success factor. Scholars have already identified the relevance of top management support as a success factor for project management in the past (Bryde, 2008; Kloppenborg et al., 2014) and in the

relationship between affordance actualization and organization (Dremel et al., 2020). Existing literature has as well identified the influence of executive leadership on IS implementations success (Kruse et al., 2016; Fennelly et al., 2020), noting its relevance.

Our proposal (Figure 1) is to integrate the emerging constructs in Perez and Vitari (2020) process-based framework. With the inclusion of the constraints perception on the recognition step and the Top Management Sponsorship influence on the Behaviour step, we are providing a more complete framework to address the technology and organization relationship.

## Conclusions

This research has aimed to provide a perspective on the current status of affordance theory applied to IS while expanding our knowledge of the affordance actualization step and the factors that influence that actualization. Through an iterative process based on the literature of previous scholars (Bernhard et al., 2013; Pozzi et al., 2014; Perez and Vitari, 2020), a process-based affordances theoretical framework has been provided. This model can support further research on IS using the affordance lens. We consider that we have answered our research question, “*How do organization actualize affordances?*”, by having applied the theoretical framework from Perez and Vitari (2020) and further developing it with two additional constructs. First, an additional influence to the affordance actualization: the top management construct. In so doing, we have answered the call from Strong et al. (2014) to further research affordance actualization from an organizational perspective, providing an updated theoretical framework. Second, by including the constraints perception by the organization in the model. In this way we contribute to the stream of research aiming at improving Bernhard et al. (2013) and Pozzi et al. (2014) affordance theory frameworks and consolidated the existing literature at the time (Naik, 2020; Ostern et al., 2021).

## Limitations and further research

The research also had several limitations. First, the use of qualitative methodology is not the most suitable to make generalizations (André Queirós et al., 2017). Second, this research has used a single international company to study, with four individual case studies. Third, the total number of interviews (18) is, again, limited in terms of theoretical generalizations. These limitations lead us to suggest directions for further research to put into practice the resulting theoretical framework in research on other industries and on different organizations to improve it and become a reliable tool for practitioners.

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