



Nurturing employee market knowledge absorptive capacity through unified internal communication and integrated information technology

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ABSTRACT

Organizations that are actively engaged in the dissemination of market information frequently question whether this effort improves employee information processing. We examined how the adoption of two integrative dissemination mechanisms, unified internal communication and information technology integration, is critical to enhancing employee market knowledge absorptive capacity. Using data from 211 industrial firms, we found that the existence of a greater market knowledge base and explicit market knowledge within firms determines the use of these mechanisms, which in turn increases employee absorptive capacity. Indeed, the mechanisms serve as full mediators for this ability, thus accentuating their value for knowledge, information technology, and innovation management.

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1. Introduction

The effective dissemination of market information is becoming increasingly important to organizations because it is required to supply market information to relevant employees, make customer and competitor analysis possible [81] and improve innovativeness and new product performance [23,89]. This makes managers aware of the necessity of adopting the dissemination structures that best fit the characteristics of the market knowledge to be distributed and thus ensure the best conditions for its use.

Companies have typically developed information-sharing systems and technologies for the efficient storage and distribution of knowledge in order to enhance the quality of knowledge management [79]. However, because the mere use of this type of tool may not automatically make employees more knowledgeable [79] or ensure perceived information quality (i.e., accuracy, relevance, clarity, timeliness) [61], managers have developed integrative mechanisms through which information dissemination activities and technologies are coordinated to guarantee improved delivery to employees. In fact, the management of information dissemination through integrative mechanisms, such as the combination of multiple channels for consistent knowledge

transfer or information technology (IT) integration, is deemed to be essential for firms to effectively apply market information (e.g., [9,20]).

Consistent with the idea that integration, understood in terms of coordination, is crucial for successful innovation [29], a question arises regarding whether these integrative dissemination mechanisms are able to enhance employee capacity to process and exploit market knowledge. Different but complementary theoretical approaches emphasize the significance of the management of market information dissemination in improving the information processing abilities of employees. The market information processing view of organizational learning [65,81] and the market orientation theory [50], which incorporates an operational focus [7], assert that the management of market information dissemination is a key process for achieving a shared interpretation of this information among employees and effectively responding to market needs. Similarly, absorptive capacity (AC) theory [17] holds that the effective distribution of information directly facilitates the development of employee AC, i.e., the ability to acquire, assimilate, transform, and exploit knowledge (e.g., [54,56,91]). Although the combination of these views suggests that the development of employee AC through the effective management of dissemination is critical for responding to market demands, these approaches simply equate dissemination with information-sharing activities, overlooking both the role of integrative mechanisms in this process and the characteristics of market knowledge that dictate their use in firms.

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In this study, we develop a model that offers a managerial and cognitive conception of the process through which firms use specific integrative dissemination mechanisms for employees to effectively absorb market knowledge. In particular, we suggest that the existence of a greater market knowledge base and more explicit market knowledge within firms determines the use of two mechanisms – unified internal communication and IT integration – which in turn increase employee market knowledge AC. By coordinating or unifying internal communication (UC), we refer to the coordination of information dissemination activities and technologies for the transmission of clear and consistent market information, as well as market-oriented values, to individuals. By integrating technology for market information provision (TP), we refer to the provision of market information through shared databases and other information systems and technologies to relevant departments and individuals. Drawing on the fit-as-mediation view of contingency theory [27,90], which posits that knowledge characteristics dictate the design of the specific mechanisms that facilitate information processing [34,85], we specifically examine the mediating roles of UC and TP in the relationships between market knowledge characteristics and employee AC to shed light on the salience of these mechanisms within firms.

Our study provides a number of contributions. First, we combine key aspects of the theories mentioned above to offer an enriched understanding of the relationship between the management of information dissemination² and employee AC, which has been neglected in prior research [54,91]. Second, we expand on the concept of market knowledge AC [58] by providing insight into the importance of this determining factor of innovation capacity [57]. Third, our study is helpful in understanding the key role of integration in the dissemination process because integrative mechanisms account for the effects of market knowledge characteristics on employee AC.

2. Literature review

2.1. UC and TP

Market information dissemination is the process by which this type of information is distributed within an organization [62] through different information technologies and activities [61]. To this end, companies provide consistent information using a variety of combined dissemination and sharing structures (e.g., [54]), such as formal meetings, memos, newsletters, intranet, and e-mails, which serve to coordinate functional units and integrate the acquired market knowledge [21,23,46,50].

The UC concept arises from prior research on market information processing, which has stressed that market information must be consistently disseminated throughout a firm in order to avoid contradictions, improve perceived information quality, and achieve a shared interpretation among organizational members [62,81,82]. Consistency is a constant theme in all integration-focused communication fields of theoretical enquiry because coherence between communication elements plays a key role in facilitating individual cognitive clarity and greater consensus regarding the interpretation of contents [88]. More specifically, the

² We must note that because the words “knowledge” and “information” may be difficult to distinguish at times (the distinction between knowledge and information is considered to take the form of a continuum instead of a dichotomy, so information represents knowledge for some) [20,43], in this paper we have tried to use “information” when referring to the dissemination process (i.e., internal information provision) (e.g., [50,54]) according to its definition as a flow of messages [69], and “knowledge” when referring to structured and accumulated information (i.e., stored knowledge) to be distributed as well as information processed by employees (e.g., [17,43]).

concept stems from the insight that the coordination of information dissemination activities and technologies involves the combined use of multiple channels that consistently reinforce one another to enhance the use of knowledge in companies [20]. In this way, these coordinated channels transmit compatible, i.e., clear and unambiguous, information, which leads to an improvement in the level of information quality perceived by employees [92]. By the same token, scholars argue that organizations coordinate information channels effectively in order for organizational members to share a clear, consistent, and understandable vision as well as market-oriented values (e.g., [50]).

Integration is a common term in the information systems literature [38]. In particular, research on database systems stresses the importance of the integration of information through the use of information systems and technologies, i.e., IT [39]. This body of research suggests that information system integration involves both data and infrastructure integration [33,35] and leads firms to attain greater technical standardization, broader user access to common data and resources, greater inter-functional cooperation, and process orientation [33,39]. Drawing on these insights, we conceptualize TP as the practice of integrating market information through technical integration and providing the information to relevant departments and individuals. This is consistent with the marketing literature, which suggests that firms make extensive use of IT to compile or integrate market information and either direct it solely where it is required to satisfy different information needs or, if necessary, distribute it more widely (e.g., [21,22,81]). Indeed, shared databases, such as data marts, and other specific information systems, such as CRM-software, serve as repositories in which market knowledge can be stored, integrated, and retrieved when needed (e.g., [21,41,83]). Complementarily, communication media and devices (i.e., information technologies) link information systems with the people who need the information [24].

2.2. Market knowledge characteristics

Market knowledge is defined here as “the firm’s knowledge of its customers’ behaviors and needs as well as its competitors’ behavior” ([23], p. 97) to be distributed to employees. Although several of its attributes have been emphasized in the literature, size and tacitness are the most representative and critical for understanding an organization’s knowledge base [10]. The *size of a market knowledge base*, defined here as the sets of elements or individual pieces of market knowledge that represent the content of what the firm knows about customers and competitors (see [1,31]), is manifested through two interrelated dimensions: breadth and depth [55]. Specifically, market knowledge breadth is defined as the broad understanding of customers and competitors and the factors that describe them, whereas market knowledge depth refers to the level of sophistication, interdependence, and complexity of a firm’s market knowledge ([23], p. 97–98). *Tacit knowledge* is a factor that is difficult to codify and therefore cannot be formally communicated or shared [70,77]. De Luca and Atuahene-Gima ([23], p. 98) defined market knowledge tacitness as the extent to which market knowledge is difficult to articulate explicitly.

2.3. Employee market knowledge AC

Although scholars have analyzed the AC concept on different levels (e.g., individual, business unit, organization, cluster) [67], there is growing interest in understanding its individual dimension because it is key for the development of a firm’s AC [17]. Several definitions of individual AC have emerged in the literature. For example, in the context of ERP system usage, Park et al. ([74], p. 302) defined user AC as the ability of an organizational member to

value, assimilate, and apply new knowledge regarding ERP systems.

Although definitions of AC are typically framed within the context of technological knowledge, recent studies are extending the construct to distinct research areas and applying it based on different interpretations [14]. In particular, market knowledge AC (see [67,80]) is an emergent and valuable concept because market knowledge provides insights into the applications of the technological knowledge that firms possess [23,45,59].

We aim to study employee market knowledge AC because organizations will not increase their product innovation performance unless their individual members have the ability to acquire, assimilate, and create value (i.e., create new product opportunities) based on market knowledge [53,66]. By building on Zahra and George's [96] conceptualization of AC, we propose an adaptation of the construct to the domain of market knowledge. As such, employee market knowledge AC in our study consists of the ability to acquire, assimilate (i.e., understand and interpret), transform (i.e., integrate prior and new market knowledge), and exploit market knowledge with commercial ends. Although Zahra and George [96] differentiated between potential AC, i.e., acquisition and assimilation capacities, and realized AC, i.e., transformation and exploitation capacities, several authors have questioned this categorization into two subsets of capacities (e.g., [86]). Reinforcing this claim, researchers have empirically demonstrated the superiority of four-dimensional AC models relative to other models that categorize the four dimensions into potential and realized AC (e.g., [30,47]). Therefore, the literature suggests that acquisition, assimilation, transformation, and exploitation represent four distinct dimensions of AC that exhaustively cover the domain of this concept [14].

3. Theoretical framework and hypotheses

3.1. Conceptual framework and research model

Market information processing, market orientation, and AC perspectives serve as a general framework for our study because they are clearly linked to managing the dissemination of information. The dissemination of market information is conceived as a process that is related to the processing of market information and links the acquisition of information with its interpretation [81]; it is also an integral component of a market orientation that connects the generation of market information with responsiveness to this information [50]. We assume that "a firm that is effective in generating market intelligence gains no advantage from such behavior if the intelligence is not disseminated effectively, or if it is disseminated but not responded to by the functions within the firm" ([5], p. 63). This inherently suggests that effective dissemination management is essential in the market orientation process.

AC tradition holds that the development of AC is highly dependent on the specific mechanisms that firms use to disseminate knowledge internally [54,56,75,91]. Therefore, although market orientation theory asserts that dissemination directly affects responsiveness, AC theory suggests that the capacity to process and exploit knowledge is required first. Indeed, AC is significantly associated with innovation capacity (e.g., [17,51,57]). This implies that employee AC represents a missing link in the relationship between dissemination and responsiveness. Consequently, the combination of these approaches implies that dissemination may not mediate between acquired market knowledge and responsiveness, but could rather be regarded as mediating between acquired market knowledge and employee AC. The full process is represented in Fig. 1.

According to this combined approach, we suggest that the characteristics of the acquired market knowledge will determine the most adequate dissemination mechanisms that generate increased absorption by employees. This assumption is supported by the fit-as-mediation view of contingency theory [27,90], which argues that knowledge dictates the type of mechanisms that should be implemented, thus affecting employee information processing. This view therefore claims that knowledge is not inherently valuable unless it could be effectively absorbed by employees through its effect on the adopted dissemination mechanisms (see [23]). Similarly, Galbraith's [34] information processing view holds that managers adopt specific mechanisms to address the requirements of the contingencies they face in their organizations, particularly the information-processing requirements of contingency factors, such as knowledge characteristics [11,23,85]. According to this rationale, the dissemination mechanisms selected by a firm would mediate the relationship between market knowledge and successful employee absorption. Thus, in our model, the fit between the characteristics of acquired market knowledge and integrative dissemination mechanisms must be seen as a sequential process rather than an interaction, given that increased information-processing demands determine the integrative knowledge mechanisms that are believed to ensure the absorption of knowledge.

Previous arguments provide the theoretical framework for our conceptual model, which is illustrated in Fig. 2. We theorize that UC and TP, as integrative dissemination mechanisms, guarantee increased employee absorption of a greater volume of market knowledge and explicit market knowledge, as discussed below.

3.2. Hypotheses

3.2.1. Effects of market knowledge characteristics on UC and TP use

Over time, the acquisition of market knowledge results in the development of a large stock of knowledge [40]; this will require a firm to use distinct communication tools, that is, a more complex communication structure [13] to effectively disseminate such a large amount of information. This, in turn, may increase the probability of transmitting confusing or contradictory information, especially when these tools are not properly selected or controlled (see [61]). Because managers are concerned with delivering consistent information to increase the quality of the information product [28], the dissemination of a larger amount of market information is expected to lead them to coordinate the communication structure to transmit clear and consistent market information that reduces equivocality [19] and provides a shared basis for concerted actions by all departments ([50], p. 5). This is congruent with the above assumption that firms develop information processing mechanisms that are capable of coping with knowledge contingencies. From the above discussion, we proposed:

Hypothesis 1. The larger the size of a firm's market knowledge base, the greater the use of UC.

Similarly, when a firm's market knowledge base starts growing, managers decide to use market knowledge stores or databases that function as part of the firm's organizational memory [48,82], as well as specific software that also serves as a repository of high volumes of knowledge [24]. Troy et al. [87] emphasized the use of a centralized system for market information storage when there is an important volume of market information to cope with in the firm. Indeed, an increased knowledge base encourages firms to implement IT because it produces information efficiencies [24]. Specifically, we posited that the greater the market knowledge base, the greater the use of a centralized system for data storage along with complementary information technologies and systems

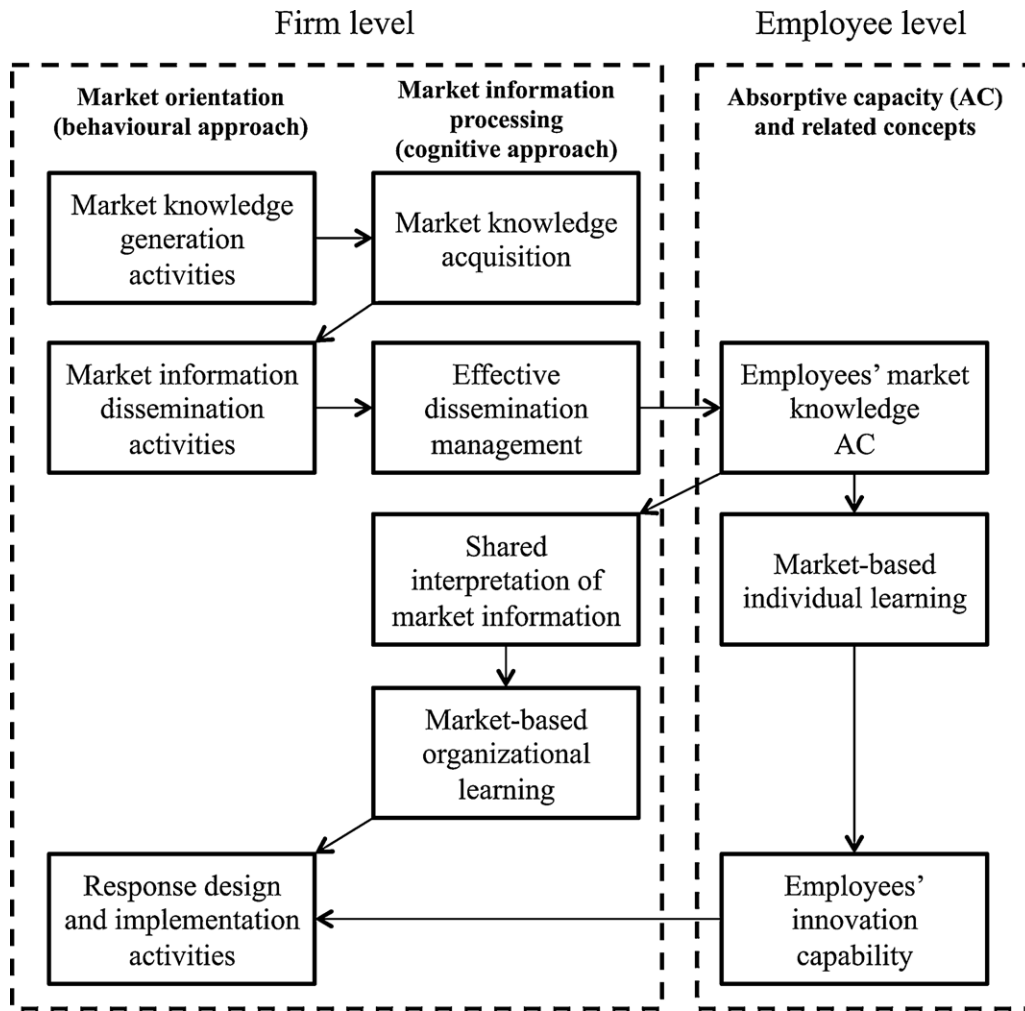


Fig. 1. A combined approach of market information processing, market orientation, and AC theories at the firm and employee levels.

[2,8,24,37,42,95] that allow firms to distribute or selectively direct information to enhance the quality of decision making or tasks [18,81]. Thus, we proposed:

Hypothesis 2. The greater the size of a market knowledge base, the greater the use of TP.

Polanyi [77] classified knowledge into tacit and explicit knowledge, both of which demand different communication

activities to be transferred to employees [68]. Although tacit knowledge transfer occurs through diverse social interaction mechanisms [69], it has been suggested that skilled team leaders may be more useful in distributing tacit market knowledge [23]. However, the dissemination of explicit market knowledge could be conducted through alternative methods. Indeed, Nonaka et al. [71] argued that companies frequently engage in the dissemination of explicit (i.e., articulated) market knowledge by combining

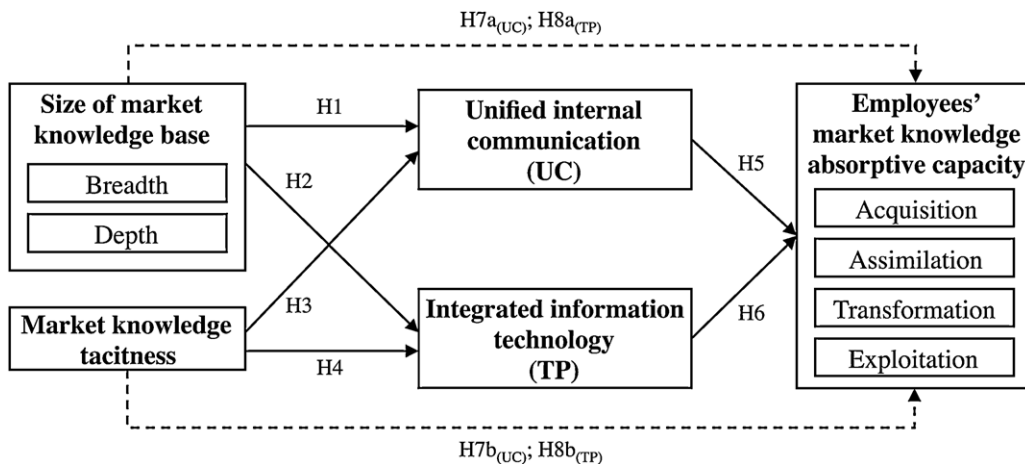


Fig. 2. Proposed model.

different communication systems and activities with the aim of transmitting a unified vision of the market within the firm. When knowledge is explicit, firms accurately encode a meaningful and complete message; for this reason, they frequently use the available complex of communication channels to induce a synergistic distribution of information (see [21,94]). In this sense, we hypothesized that the greater the explicitness, the greater the use of UC; that is, as the level of tacitness of market knowledge increases, the need to use UC is reduced.

Hypothesis 3. The more tacit the market knowledge, the less UC is used.

Because explicit knowledge can be codified in formal language, knowledge management efforts have focused on developing new IT applications to support the storage and distribution of this knowledge [37]. Specifically, to be properly recorded and disseminated, more explicit knowledge requires databases and computerized communication networks and tools (e.g., [26,37,68,72,93]). Accordingly, we suggested that TP use may be more frequent when market knowledge is explicit or easily codified; that is, market knowledge tacitness is inversely related to the use of TP.

Hypothesis 4. The more tacit the market knowledge, the less TP is used.

3.2.2. Effects of UC and TP on employee market knowledge AC

Employee knowledge absorption depends on the recipient's ability to integrate new and existing knowledge, which requires the aggregation of different knowledge elements [36]. This ability is greatly enhanced when newly provided information is related to knowledge that has been previously communicated and learned [17]. Therefore, when companies transmit consistent market information through different but combined information technologies and activities, employees can associate the pieces of information more easily, and it is therefore expected that AC would be enhanced. Stated formally:

Hypothesis 5. The use of UC will positively affect the capacity of employees to absorb market knowledge.

Matusik and Heeley [64] argued that the knowledge transfer structures that ease the flow of information to the appropriate people and areas of the firm enable the absorption of new external knowledge. Several scholars have claimed that IT provides high accessibility to information, which improves employee AC [17,73,78]. Song et al. [84] also argued that computer-assisted communication technologies increase individual AC by providing accurate, comprehensive, and timely market information [42]. Accordingly, we posited that TP would have a positive connection to employee market knowledge AC.

Hypothesis 6. The use of TP will positively affect the capacity of employees to absorb market knowledge.

3.2.3. Mediating effects of UC and TP

This study further posited that the proposed integrative dissemination mechanisms (i.e., UC and TP) mediate the relationships between market knowledge characteristics and employee AC. As previously discussed, these propositions draw on the fit-as-mediation view of contingency theory, which asserts that knowledge functions as a contingent factor that dictates the design of suitable information-processing mechanisms, which in turn, influence knowledge-processing capacity [34]. Following this framework and the previously mentioned points, we postulated that UC and TP would enable firms to enhance employee capacity

to absorb a greater volume of market knowledge and explicit market knowledge. In other words, when a firm must disseminate explicit and increased market knowledge and is not able to ensure the consistency of market information across different media or integrate market information and direct it to relevant people through IT, this firm will not effectively nurture employee capacity to absorb this knowledge. This coincides with the assumption that simple exposure to knowledge without the use of mechanisms that encourage information quality is insufficient for the development of AC (e.g., [17,53,63]). Hence, UC and TP permit firms to increase the quality of the information required to develop increased market knowledge AC. Based on this reasoning, we proposed:

Hypothesis 7. UC mediates the effects of market knowledge (a) size and (b) tacitness on the capacity of employees to absorb market knowledge.

Hypothesis 8. TP mediates the effects of market knowledge (a) size and (b) tacitness on the capacity of employees to absorb market knowledge.

4. Method

4.1. Pretest, sample and data collection

To test our hypotheses, we initially assembled a questionnaire utilizing measurement items that were sourced from the existing literature and adapted to the context of this study. In the case of UC and TP constructs, new scales were developed. We consulted 21 managers and 4 academic experts to evaluate the appropriateness of each survey item in gauging what we intended to measure (i.e., content validity). We made some modifications to the questionnaire items based on the feedback we received. We then administered the preliminary draft questionnaire to a pilot test group of managers from large industrial firms. The questionnaire was again revised, drawing on the feedback from the pilot experiment. Next, we conducted the main survey study. We collected data from Spanish manufacturing companies that were selected from the S.A.B.I. database of Bureau Van Dijk. We selected firms with at least 100 full-time employees, in line with the recommendations of practitioners as well as previous studies (e.g., [16]). The final list consisted of 1853 companies.

A major market research company in Spain performed the data collection using a CATI system to administer each survey. 750 randomly selected firms were contacted by telephone to request their participation in the survey. A total of 324 firms showed initial interest in participating. Our main target respondents were the managers who were the most knowledgeable about the studied topics and therefore able to provide informed responses. Of the 324 firms, 19 were eliminated after completing a short pre-screening questionnaire because their respondents scored lower than six on seven-point scales of knowledgeability and involvement [15].

Ultimately, 211 firms provided complete data for an effective response rate of 28.13% (211 out of 750). The participating firms had an average of 356 employees and an average annual income of €114,857.42m. Because they operated in a variety of manufacturing sectors, we performed analysis of variance and post hoc Tukey multiple comparison tests that revealed no statistically significant differences in the mean responses to any of the key variables in this study across firms in different industries. To check for non-response bias, we compared the demographic (e.g., number of employees, sales volume, and sector) and model variables of early and late respondents [4]. The *t*-tests yielded no statistically significant differences on any variable, which suggested that non-response bias was not a significant problem in this study. To examine reliability issues associated with single-informant data,

Table 1
Correlations and summary statistics.

Construct	1	2	3	4	5	6	7	8	9
1. Market knowledge breadth	0.79 ^a								
2. Market knowledge depth	0.62 ^{***}	0.77							
3. Market knowledge tacitness	0.21 ^{**}	0.22 ^{**}	0.75						
4. UC	0.34 ^{***}	0.26 ^{***}	−0.02	0.79					
5. TP	0.20 ^{**}	0.26 ^{***}	0.01	0.55 ^{***}	0.77				
6. Employee acquisition capacity	0.21 ^{**}	0.14	−0.06	0.39 ^{***}	0.58 ^{***}	0.71			
7. Employee assimilation capacity	0.28 ^{**}	0.32 ^{***}	−0.02	0.41 ^{***}	0.56 ^{***}	0.67 ^{***}	0.83		
8. Employee transformation capacity	0.22 ^{**}	0.32 ^{***}	0.13	0.48 ^{***}	0.49 ^{***}	0.62 ^{***}	0.79 ^{***}	0.84	
9. Employee exploitation capacity	0.19 ^{**}	0.22 ^{**}	−0.08	0.49 ^{***}	0.46 ^{***}	0.59 ^{***}	0.70 ^{***}	0.86 ^{***}	0.76
Number of items	2	3	3	3	3	3	3	3	3
Mean	4.21	4.11	3.96	5.55	4.75	5.05	4.65	4.87	5.58
Standard deviation	1.49	1.43	1.61	1.42	1.57	1.56	1.48	1.45	1.26

^a Figures on the diagonal are the square roots of average variance extracted (AVE).

^{*} One-tailed test; $p < 0.05$ ($n = 211$).

^{**} One-tailed test; $p < 0.01$ ($n = 211$).

^{***} One-tailed test; $p < 0.001$ ($n = 211$).

we attempted to survey two additional members of each responding firm. Our effort ultimately resulted in 86 responses from 43 firms (2 respondents per firm) that were comparable in size to our full sample. We calculated an interrater agreement score (r_{wg}) for each study variable [44]. The median interrater agreement ranged from 0.79 to 0.95, suggesting high agreement. Additionally, the examination of intra-class correlations revealed a strong level of interrater reliability ($p < 0.001$) [49].

4.2. Measurements

Multi-item scales were compiled and adapted for our instrument on the basis of a review of the literature, field interviews, and a pilot test, as discussed above. The UC measure reflected the extent to which market information and market-oriented values are uniformly transmitted by different and coordinated internal communication channels and tools. The TP measure addressed the degree to which a firm combines the available IT to integrate market information and direct it to the appropriate employees.

The size of the market knowledge base was measured using breadth and depth as reflective dimensions of a higher-order construct. Measurements of market knowledge breadth and depth, as well as market knowledge tacitness, were adopted from the work of De Luca and Atuahene-Gima [23].

Drawing on existing multidimensional scales of firm AC (e.g., [45]), we assessed the measurement scale for employee capacity to absorb new market knowledge. Selected items for each AC dimension proposed by Zahra and George [96] (i.e., acquisition, assimilation, transformation, and exploitation) were adapted to measure manager perceptions of employee AC. The dimensions of AC have been shown to be empirically distinguishable [45] and are preferably and accurately modeled as individual dimensions of the higher-order construct of firm AC (e.g., [12,30,47]). Analogously, we modeled acquisition, assimilation, transformation, and exploitation capacities as reflective dimensions of a second-order construct.

The measurements for all scales in the questionnaire involved perception statements and required respondents to check a seven-point agreement scale. A list of the items retained after a scale purification process can be found in Appendix.

4.3. Measurement model validation

Before we proceeded to apply the two-step approach suggested by Anderson and Gerbing [3] to validate the measurements used to test the model, we conducted a confirmatory factor analysis (CFA) to respectively test two- and four-dimensional specifications of the

size of market knowledge base and employee market knowledge AC concepts. We estimated these models using LISREL 8.80. For the size of market knowledge base, the CFA indicated an effective correspondence with the data after scale purification ($\chi^2_{(4)} = 1.24$, $p = 0.87$; CFI = 1.00; NNFI = 1.01; RMSEA = 0.0; GFI = 1.00). A unidimensional model for this concept was also estimated for comparison purposes. A chi-square difference test suggested that the unidimensional model provided a significantly poorer fit to the data³ (53.36 $\Delta\chi^2$ increase with 1 additional df , $p < 0.001$). The same procedure was undertaken for employee market knowledge AC. A four-dimensional model ($\chi^2_{(48)} = 86.44$, $p = 0.00056$; CFI = 0.99; NNFI = 0.98; RMSEA = 0.057; GFI = 0.94) performed significantly better than both a unidimensional model (246.98 $\Delta\chi^2$ increase with 6 additional df , $p < 0.001$) and a two-dimensional model in which acquisition and assimilation items were loaded on a unique factor representing potential AC, and transformation and exploitation items were loaded on another factor representing realized AC [96] (100.08 $\Delta\chi^2$ increase with 5 additional df , $p < 0.001$). These results showed consistent model fits, which encourage the use of the higher-order factors at the general level in this study.

We estimated the general measurement model using the CFA procedure to assess construct unidimensionality, reliability, and validity. Items retained after scale purification loaded significantly on the expected constructs (completely standardized loadings ranged between 0.57 and 0.95; minimum t -value = 8.12), which indicated the convergent validity of the measurements [3]. The fit indexes suggested a good fit of the measurement model ($\chi^2_{(263)} = 441.37$, $p < 0.001$; CFI = 0.97; NNFI = 0.97; RMSEA = 0.055; GFI = 0.86). In Table 1, we present the summary statistics and correlations among the study variables.

The reliability of the measurements was calculated using Bagozzi and Yi's [6] composite reliability index and Fornell and Larcker's [32] average variance extracted index. For all the measurements, both indices were higher than the evaluation criteria of 0.6 for composite reliability and 0.5 for the average variance extracted (AVE) [6] (see Appendix). Evidence of discriminant validity is provided by two different tests recommended by Anderson and Gerbing [3]. First, no confidence intervals of the correlations between any of the latent indicators included 1.0. Second, 36 additional confirmatory factor analyses separately constrained the correlations of two sub-constructs to 1.0 and the resultant models produced poorer fits ($\Delta\chi^2$ increases with 1 additional df , $p < 0.001$).

³ To compare models, we used Normal Theory Weighted Least Squares Chi-Square.

We also examined common method variance (CMV) using Harman's single-factor test [76]. The model fit statistics showed significant problems with the single-factor solution and the model was therefore rejected ($\chi^2_{(299)} = 1565.22$, $p < 0.0$; CFI = 0.80; NNFI = 0.78; RMSEA = 0.15; GFI = 0.60). The result of a chi-square difference test revealed that the fit of the single-factor model was significantly worse than that of the proposed model ($1123.85 \Delta\chi^2$ increase with 36 additional df , $p < 0.001$). Additionally, marker variable partial correlational analysis [60] was conducted as a more rigorous procedure to assess CMV. The smallest positive correlation among all pairs of constructs ($r = 0.01$) was used to partial out its effect from the remainder of the correlations because it can be conservatively assumed to represent CMV [60]. The statistical significance of the correlations does not change after adjustment, which suggests that CMV is unlikely to affect the results. Subsequent sensitivity analyses also indicate the absence of this bias.

5. Analysis and results

To test the hypotheses underlying the theoretical model presented in Fig. 2, the proposed direct and mediating effects were estimated using structural equation analysis. The results of the LISREL 8.80 estimation of the model and the associated hypotheses tests are reported in the following sections.

5.1. Test of structural model

We first report the results of the estimation of a model that included the hypothesized effects. This model produced a good fit to the data and explained 33%, 26%, and 38% of the variance in UC, TP, and employee AC, respectively. Although the model was parsimonious, it explained a substantial portion of the variance of endogenous variables. The predictive power of the independent variables was tested by examining the magnitude and significance of the standardized estimates for path coefficients. The results are reported in Table 2 (see Model 1).

First, we found that market knowledge breadth ($\gamma = 0.71$, $p < 0.001$; $R^2 = 0.51$) and depth ($\gamma = 0.71$, $p < 0.001$; $R^2 = 0.50$) effectively represented first-order dimensions of the reflective

higher-order construct of size of market knowledge base. Similarly, acquisition ($\gamma = 0.70$, $p < 0.001$; $R^2 = 0.48$), assimilation ($\gamma = 0.83$, $p < 0.001$; $R^2 = 0.69$), transformation ($\gamma = 0.93$, $p < 0.001$; $R^2 = 0.87$), and exploitation ($\gamma = 0.88$, $p < 0.001$; $R^2 = 0.77$) capacities represented first-order dimensions of the second-order construct of employee market knowledge AC.

The hypothesized direct relationships were statistically significant and in the predicted direction, strongly supporting the proposed model. Accordingly, the relationships between the size of the market knowledge base and both UC and TP were positive and highly significant ($p < 0.001$), with only minor differences in the relative strength of path coefficients. Therefore, Hypotheses 1 and 2 were supported. The necessity of UC and TP was also greater when the market information was explicit rather than tacit, as reflected by the statistically significant path coefficients of the expected signs between tacitness and both UC ($p < 0.01$) and TP ($p < 0.05$). Thus, Hypotheses 3 and 4 were also confirmed. Empirical evidence validated Hypothesis 5, which concerned the impact of UC on employee market knowledge AC. The results suggested that this process was positively related to employee market knowledge AC ($p < 0.001$). Moreover, as predicted in Hypothesis 6, there was a positive relationship between TP and employee market knowledge AC ($p < 0.001$).

5.2. Test of mediating effects

The validity of the mediating effects was tested by comparing the hypothesized model with a less parsimonious rival model to which we added that market knowledge dimensions directly affected employee market knowledge AC. Furthermore, for both models, we specified and estimated the parameters representing the indirect effects in order to test their significance.

Table 2 reports the estimation of the rival model (Model 2). The overall fit of this direct- and indirect-effects model was reasonably good. We did not find significant direct effects of the size of the market knowledge base on employee AC. The same results were found with market knowledge tacitness, which was also unrelated to this ability. The lack of direct effects of market knowledge dimensions in the direct- and indirect-effects model supported the general position that a greater volume of market knowledge and

Table 2
Structural model results: Standardized parameter estimates and goodness of fit statistics.

Path (hypothesis)	Model 1 Model of hypothesized effects	Model 2 Model including direct effects of antecedent variables on employee market knowledge AC
Direct effects		
Size of market knowledge base → UC (H1)	0.61***	0.59***
Size of market knowledge base → TP (H2)	0.54***	0.52***
Tacitness → UC (H3)	-0.22**	-0.21**
Tacitness → TP (H4)	-0.17*	-0.17*
UC → employee market knowledge AC (H5)	0.33***	0.27**
TP → employee market knowledge AC (H6)	0.43***	0.38***
Size of market knowledge base → employee market knowledge AC		0.16
Tacitness → employee market knowledge AC		-0.02
Indirect effects		
Size of market knowledge base → UC → employee market knowledge AC (H7a)	0.20***	0.16**
Tacitness → UC → employee market knowledge AC (H7b)	-0.07*	-0.06*
Size of market knowledge base → TP → employee market knowledge AC (H8a)	0.23***	0.19***
Tacitness → TP → employee market knowledge AC (H8b)	-0.07*	-0.06*
Chi-square (df)	531.99 (286)	529.91 (284)
CFI	0.96	0.96
NNFI	0.96	0.96
RMSEA	0.063	0.062

* One-tailed test; $p < 0.05$.

** One-tailed test; $p < 0.01$.

*** One-tailed test; $p < 0.001$.

more explicit market knowledge were better disseminated through the use of UC and TP. Furthermore, there was no significant difference in the fit of the models with and without the two direct paths from market knowledge dimensions to employee market knowledge AC ($\Delta\chi^2_{(2)} = -4.93, p > 0.05$). As predicted, the indirect effects of the market knowledge dimensions on employee market knowledge AC were significant, as shown in Table 2. Overall, these results suggested that UC and TP fully mediated the effects of the antecedents on employee market knowledge AC. This supported Hypotheses 7a, 7b, 8a, and 8b. In short, our model should serve as an appropriate basis for further research.

5.3. Robustness analysis

To examine whether our results remain constant in different conditions, we re-examined our analysis by controlling for firm size because it has been identified as a key variable influencing the supply of market information. As organizations grow, their supply of market information (i.e., the amount of available information to operate) increases because its acquisition becomes increasingly routine [81]. It follows that firm size could affect the size of the market knowledge base. This variable was measured by the number of employees in the company, using a seven-point rating scale (1 = 100–149, 2 = 150–299, 3 = 300–449, 4 = 450–599, 5 = 600–749, 6 = 750–1000, and 7 = >1000). Before applying structural equation modeling, we ran a preliminary analysis of variance to establish whether the size of the market knowledge base varied according to firm size. We found no significant differences, which suggests that this variable should not be used as a covariate in the model to maintain parsimony (e.g., [25]). Nevertheless, we added the variable to the model but found no significant effect of firm size ($p > 0.1$), obtaining basically the same results as when the covariate was excluded, which suggests that our results are robust to the inclusion of firm size effects.

6. Discussion

This paper addresses a highly pertinent and timely issue related to the dissemination of market information and IT management in organizations. We have developed an approach that combines several theories and asserts that effective dissemination management may enhance employee market knowledge AC. Specifically, the proposed model is grounded on the contingent proposition that market knowledge characteristics dictate the design and use of integrative dissemination mechanisms. Our results reveal that employees effectively absorb a greater volume of market knowledge and explicit market knowledge when UC and TP serve as mediators. The main theoretical and managerial implications of the study are detailed below.

6.1. Theoretical implications

This research builds on and extends previous research in several ways. First, it combines several theoretical perspectives to explain how the management of market information dissemination may lead to superior employee market knowledge AC. This responds to recent calls in the literature that stress the importance of analyzing AC and its antecedents in this knowledge domain (e.g., [58]). In particular, the study goes beyond the traditional focus of the literature on equating dissemination to information-sharing technologies and activities, identifying integrative dissemination mechanisms as contemporary methods that facilitate employee information processing by increasing the quality of the distributed information. This extension enhances the understanding of how employee AC is nurtured within organizations via the management

of information dissemination activities and technologies through integration. Indeed, we have demonstrated that UC and TP are critical mechanisms in helping employees integrate information easily and generate useful market responses. This finding strongly supports the enabling role of the different forms of integration in achieving the innovation-related outcomes stressed in the organizational integration literature [29].

The findings also contribute to the understanding of how market knowledge characteristics, integrative dissemination mechanisms, and employee AC are associated. We have found that market knowledge characteristics are related to UC and TP, and that these mechanisms, in turn, account for employee AC. In fact, we have demonstrated that UC and TP are key mechanisms in the processing of market information, characterized by its volume and explicitness, which constitutes the first empirical evidence that UC and TP fully mediate the relationships between market knowledge characteristics and employee AC. In other words, mere exposure to voluminous or explicit market knowledge does not guarantee that individual employees will accurately absorb this knowledge, corroborating the theoretical assumption that effective dissemination is a key antecedent of AC [91].

This result also suggests new and noteworthy insights regarding the role of the proposed integrative dissemination mechanisms in enhancing IT and knowledge management. Specifically, this study contributes to information system research by showing that managing IT in an integrated way improves the quality of the knowledge management process and therefore enhances the development of employee abilities. In this sense, our study not only recognizes the potential of IT regarding knowledge management, which is extensively discussed in the literature, but also adds that the implementation of integrative mechanisms increases the information system's usefulness in knowledge management and its effectiveness from the perspective of employees. These insights are fundamental to future research on information system integration and information system use in knowledge management activities.

Furthermore, our results also suggest that employee-level market orientation [52] could be developed through the use of UC and TP because the positive effect of these mechanisms on employee market knowledge AC explicitly facilitates market-oriented cognitions and actions. This constitutes a valuable addition to the literature.

6.2. Managerial implications

Firms that actively invest in improving their information dissemination activities and technologies frequently question whether this effort enhances employee capacity to process and exploit information. Our results suggest that managers should first consider the characteristics of the market knowledge required to respond to market needs to properly manage the dissemination process. In particular, UC and TP would be necessary for firms that possess broad, deep, or explicit market knowledge; that is, firms must manage IT resources and information activities in a coordinated way to adapt to information-processing requirements. If this issue is not considered, it may be detrimental to the potential capacity of employees to absorb market knowledge. Indeed, we empirically assessed the value of UC and TP in the development of this ability, which offers practitioners a useful indicator of the effectiveness of these mechanisms. We must suggest that the adoption of UC and TP may imply that managers need to establish a central authority or control in the management structure to ensure that all of the dissemination channels are coordinated and integrated.

Although it is known that IT can play an important role in facilitating knowledge management in large companies, our

research might help managers recognize that the benefits of IT in relation to knowledge management cannot be fully attained until IT is applied in an integrated way. Specifically via UC and TP mechanisms, IT can strengthen and accelerate knowledge management by reinforcing the quality of information and information provision in terms of consistency, accuracy, timeliness, and customization to the recipient. Therefore, managers must facilitate integration when implementing IT. This also suggests that to take full advantage of IT, organizations should take a knowledge management perspective on information system development. This means that managers should consider what knowledge is required within the firm so as to apply the most suitable information systems and mechanisms to manage this knowledge and enhance its absorption. The task for managers would thus be to use the proposed integrative mechanisms to design an information system that effectively responds to knowledge management needs.

Because the information tools and activities that can be used for the dissemination of market information and the methods of managing them may differ from business to business and prove difficult for competitors to imitate, firms should note that opportunities to gain and sustain a competitive advantage may arise through the development of UC and TP because these mechanisms could lead firms to differentially impact employee AC with respect to firms that are less committed to dissemination management.

Finally, the management of information dissemination activities and technologies through UC and TP is essential for market orientation. The use of UC and TP reduces the probability of failing to implement a market-oriented culture; managers should therefore carefully balance the attention they devote to the collection and dissemination of market information. Although the gathering of market information is the first step to generating a market orientation, managers must be aware of the importance of matching the collected information with the mechanisms designed to distribute it internally because this conjunction could be especially critical for achieving effective responses to market needs.

6.3. Limitations and future research directions

There are several limitations inherent to our research. First, the research was based on cross-sectional data, and the possibility of reverse causality in the model could therefore not be eliminated. However, our focus was on the view of knowledge as a contingency factor that determines the most adequate dissemination mechanisms for firms and the direction of the proposed relationships are therefore justified. Nevertheless, further research using longitudinal data and cross-lagged analysis will be necessary to exclude the potential for this bias.

Second, although we collected the data from a variety of sectors in the Spanish manufacturing industry and thereby achieved a greater level of variance, the generalization of the findings to other types of organizations (e.g., service firms) and countries is limited. Further research might explore whether the relationships we hypothesized also exist in other contexts. Third, despite the fact that our measurement analysis indicated reliable and valid measurements, a limitation was that all of these measurements were based on data that were reported by a single respondent in each firm. However, as previously stated, the respondents were the top managers who had the most complete information for the purposes of our study; we also validated these responses by collecting data from two more respondents in 43 of the sampled firms. Fourth, Harman's one-factor analysis and the marker variable technique provided evidence against the presence of common method bias. However, this issue cannot be ruled out completely.

Finally, it may be interesting for further research to test the effects of other variables in the model, such as leadership structure, incentive structure, or task complexity, which may affect the constructs of our model.

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Appendix. Measurements^a

Size of market knowledge base

Market knowledge breadth [Cronbach's α = 0.77; Composite reliability (CR) = 0.77; Average Variance Extracted (AVE) = 0.63]

Compared to our major competitors, our firm's knowledge

about ...

- ... competitors' strategies is broader.
- ... our customers is wider ranging.

Market knowledge depth [α = 0.80; CR = 0.80; AVE = 0.59]

Compared to our major competitors, our firm's knowledge about ...

- ... competitors' strategies is more advanced.
- ... our customers is deeper.
- ... our customers is more advanced.

Market knowledge tacitness [α = 0.80; CR = 0.79; AVE = 0.56]

Market knowledge competencies are difficult to ...

- ... comprehensively document in manuals or reports.
- ... identify without personal experience using them.
- ... precisely communicate through written documents.

Unified internal communication (UC) [α = 0.81;

CR = 0.83; AVE = 0.62]

- Our company coordinates internal communication channels and tools to transmit clear and consistent market information to employees.
- Our company communicates and/or transmits a consistent vision and solid market-oriented values throughout the firm.
- Our company strategically verifies that market information transmitted through different internal media is not contradictory or incongruent.

Integrated technologies for the provision of market information (TP) [α = 0.81; CR = 0.81; AVE = 0.59]

- Our information technologies are designed and managed to direct new or stored market information to the appropriate employees and induce them to use it when needed.
- Our company combines the available information technologies to facilitate access to market information and achieve a synergistic distribution of information.
- Our company integrates market information collected or generated from different areas, divisions or external sources into shared databases.

Employee market knowledge absorptive capacity

Acquisition capacity [$\alpha = 0.70$; $CR = 0.73$; $AVE = 0.51$]

- Our employees quickly identify and acquire new market knowledge that has been formally and informally collected by the company.
- Employees can effectively collect internally provided market information.
- Our employees have the ability to readily capture and put to memory the relevant market knowledge that is made available to them and that they require to develop their work.

Assimilation capacity [$\alpha = 0.87$; $CR = 0.87$; $AVE = 0.70$]

- Our employees quickly recognize shifts in the market from the information distributed to them.
- New opportunities to serve our clients are quickly understood by our employees from the information distributed to them.
- Our employees quickly analyze and interpret changing market demands from the information distributed to them.

Transformation capacity [$\alpha = 0.88$; $CR = 0.88$; $AVE = 0.71$]

- Our employees quickly recognize the usefulness of the new market knowledge that is distributed to them with regard to their existing knowledge.
- Our employees identify opportunities for the company from the new market knowledge that is distributed to them.
- Our employees have the ability to combine existing market knowledge with the newly acquired and assimilated knowledge provided by the company, with commercial ends.

Exploitation capacity [$\alpha = 0.79$; $CR = 0.80$; $AVE = 0.58$]

- Our employees constantly consider how to better exploit the market knowledge that is distributed to them.
- Our employees are able to apply the new market knowledge that is distributed to them in their practical work.
- Our employees have the ability to use and exploit the market knowledge that is distributed to them to respond quickly to market changes (e.g., developing new products and services, responding to competitive pressures).

^a All items were measured on a seven-point scale in which 1 was “strongly disagree” and 7 was “strongly agree”.

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