Knowledge Sharing in Revenue Management Teams: Antecedents and Consequences of Group Cohesion

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ABSTRACT

The practice of Revenue Management has received widespread acceptance in the international hospitality industry yet a lack of best practice in terms of organizational integration persists. This paper follows the notion that revenue management is first and foremost a human activity, dependent on knowledge exchange and concerted decision within revenue management teams. One critical attribute of effective teams is group cohesion. The authors contrasted communication networks of 38 revenue management teams by means of social network analysis to identify the antecedents and consequences of group cohesion. It was found that industry employment, age and revenue management experience define the structure of communication networks and that awareness of other's expertise is central in explaining differences team performance across the sample. The findings highlight the issue of knowledge asymmetry in teams and suggest that the Revenue Manager occupies a more active role as an information broker in order to enhance group decision making.

KEYWORDS

Revenue Management; Group Cohesion; Communication; Performance; Social Network Analysis; Hospitality

INTRODUCTION

Revenue management (RM) is a business practice that aims to maximize revenue from every business transaction through dynamic pricing and efficient allocation of available inventory to forecasted demand (Choi and Cho, 2000). RM has become a central managerial activity in hotels and hence practitioner's interest in its intricacies and potential has grown (Mainzer, 2004). The implementation of RM systems is repeatedly reported to yield an increase in revenues (Lieberman, 1991, 2011a, b), most of which flows through to the bottom line (Burgess and Bryant, 2001). Today, RM is applied in airlines, hotels, restaurants, golf courses, shopping malls, telephone operations, conference centers and other service companies that trade perishable goods (Ivanov and Zhechev, 2012). While not essential, most RM approaches used in hotels rely on data-hungry demand forecasting systems and optimization methods requiring use of information processing technology (Cleophas and Frank, 2011). However, they also require input of business intelligence from hotel staff in the areas of sales and marketing, finance and operations. Efficient use of this dispersed knowledge requires the coordination of communication (Hansen and Eringa, 1998), a task increasingly performed by the revenue manager. RM activities require knowledge sharing in order to forecast demand, set room rates, develop strategies and track performance (Gregory and Beck, 2006: 62). The Revenue Manager provides a focus for integration of knowledge from members of the organization such as the General Manager, Sales Manager, Front Office Manager, Reservations Manager, Food and Beverage Manager and so on. The revenue manager role involves integration of information from the other staff but some authors have noted that RM is not integrated well into the overall business structure (Ivanov and Zhechev, 2012; Josephi et al., 2011; Karadjov and Farahmand, 2007; Lieberman, 2003). According to Jones and Hamilton (1992), effective RM requires a culture of knowledge sharing that facilitates targeted communication and information flows. In RM, knowledge is a resource (van der Rest, 2006) which should be shared among team members and the social relationships between members facilitate this exchange.

Given the systemic nature of RM activities, the revenue manager's role cannot be considered in isolation but must be nested in a team interacting across functional units. Surprisingly however, prior research examining RM has either studied the RM team as a whole (Jones and Hamilton, 1992; Yeoman and Watson, 1997) or the general manager (Donaghy and McMahon-Beattie, 1998). Similarly, studies into the critical success factors for RM do not discuss the role of the revenue manager (Crystal, 2007; Hansen and Eringa, 1998). This broad focus has strongly contributed to the understanding of the systemic processes and the holistic success of revenue management, but does not provide directions for improving RM human capital as suggested by Kimes (2008).

A number of scholars agree that an effective revenue management team is vital for the success of any RM system (Aubke and Wöber, 2010; Beck et al., 2011; Donaghy et al., 1995; Mohsin, 2008; Selmi and Dornier, 2011; Tranter et al., 2008). This research examines the effectiveness of RM teams and how these can be improved, an important issue not just for RM teams but for business managers generally. Team-based organizational structures have become increasingly common over the last two decades and a number of research studies have sought to understand the factors that influence team effectiveness (Cohen and Bailey, 1997; Delgado Pina et al., 2008; Kozlowski and Ilgen, 2006; Mathieu et al., 2008). At a minimum, reaching or exceeding pre-defined performance indicators requires group cohesiveness and effective communication skills. For top management teams, Cohen and Bailey (1997) depict team effectiveness as a function of group composition (demographics, size and diversity), internal processes (communication, collaboration and conflict) and environmental factors (industry traits and market effects). Gardiner and Scott (2014 in press) in a study of tourism clusters in the Gold Coast region highlight the importance of the attitudes, beliefs, values and personal characteristics of individual agents in achieving group outcomes. Personal characteristics that were found to be inducive to effective networks were trust, commitment, positive norms and leadership. It is generally agreed that cohesion is a key factor influencing team effectiveness (Hackman, 1987; Mullen and Copper, 1994; Sundstrom et al., 1990). Groups are said to be cohesive if internal relationships are strong and enhance group identity and willingness to perform as a group. Cohesive social relationships within teams are both dependent on, and facilitators of, communication and knowledge sharing (Staples and Webster, 2008). On the other hand, the literature is inconsistent in respect to network antecedents. The study aims to fill this gap by defining antecedent to group cohesion and hence team effectiveness by examining the knowledge exchange and communication within RM teams. The cohesiveness of knowledge exchange and communication relationships between team members are assessed using network analysis techniques and used to identify factors influencing team performance in the context of hotel revenue management.

LITERATURE REVIEW

This literature review examines three main concepts: group cohesion, team performance measurement and teams as networks. Each of them is now discussed in turn.

Group Cohesion

Group cohesion is considered important as it impacts on members' attitude towards the group and, as a consequence, their motivation to align with the group's output and objectives (Cartwright and Zander, 1968). Within organizational contexts, however, group performance improvements are more likely to stem from an effective organizational culture and norms such as dedication to a task, rather than from team members liking each other (Carless and De Paola, 2000), thus task cohesion (Widmeyer et al., 1985) should be differentiated from interpersonal cohesion (Mullen and Copper, 1994). This suggests that managerial action aimed at improving team performance is less likely to yield significant improvements when targeted at interpersonal factors such as attraction. Instead, the managerial focus should be redirected towards increasing members' acceptance or commitment to group tasks (Mullen and Copper, 1995). Therefore, cohesion researchers commonly conceptualize the group as a collection of individuals, and use the group as the unit of analysis (Keyton, 2000).

Group cohesion studies examining the consequences of cohesion outnumber those examining antecedents, partly because of the difficulty of isolating those antecedents that are independent of the group. Commonly, real work teams are studied at a point in time after their formation, rendering the inclusion of motivational or behavioral variables difficult. Member traits are thus often used as antecedents in group cohesion models. Van Knippenberg and Schippers (2007) suggest group diversity as an antecedent for group cohesion, but Webber and Donohue (2001) found no consistent relationship here. Relatively little attention has been paid to cohesion as mediators for other variables, e.g. Dobbins and Zaccaro (1986) claim that cohesion moderates a leader-follower relationship. In contrast, the consequences of group cohesion – and in particular performance – have received significant attention. In a meta-analysis of group cohesion studies published between 1952 and 1986, Evans and Dion (2012) found a positive correlation between group cohesion and group performance. In contrast, Podsakoff et al. (1997) reported on inconsistent empirical evidence of the relationship between cohesion and performance.

Other meta-analyses (e.g. Beal et al., 2003; Casey-Campbell and Martens, 2009) identified moderators of the cohesion-performance relationships such as group size, level of analysis and group interdependence. In summary, prior studies have not yielded consistent results due to their inherent differences in terms of populations, team tasks, research contexts, measurements and conceptualizations of cohesion (Mullen and Copper, 1995). In consequence, any studies of group cohesion can only be interpreted within the conceptual boundaries of the cohesion definition applied.

Team Performance

Team performance is a complex phenomenon and no uniform measurement for the performance effectiveness of teams exists. As a consequence, performance measures applied in the literature are very diverse, context driven and little attention has been devoted to developing accepted measurement tools. Three levels of team outcomes are commonly used in the literature – organizational level outcomes, team level outcomes and individual (role-based) outcomes. Few organizational level studies are found since few team-level actions are immediately reflected in organizational outcomes. In most cases, team output only partly contributes to organizational performance, if at all. One exception is top management teams whose work is directly aligned with organizational performance (Barrick et al., 2007; Bunderson and Sutcliffe, 2002). At a team level, the outcome measures are more diverse. To group performance measures, Beal et al. (2003) distinguish between performance behaviors and performance outcomes. The first relates to changes in team behavior as a result of work processes as well as team evolution. These authors recommend performance behaviors as the preferred measure of performance. An example of performance behaviors can be found in Kirkman and Rosen (1999), who used a supervisor rating of the team's proactivity, targeting future potential for solving tasks. In a later study on team process improvement, Kirkman et al. (2004) showed that feedback, discussion and experimentation had a positive effect on team performance. Similarly, Edmonson (1999) examined team learning behaviors. Performance outcomes, in contrast, refer to the factual outcomes of team work, which implies that the output is directly attributable to a team, an assumption which often does not hold true. Generally, little attention is paid to the definition of performance, but behavioral performance definitions appear to be more reliable in contexts where team outputs are of an intellectual, rather than a physical nature.

Teams as Networks

The network paradigm is increasingly used in research into teams (Borgatti and Foster, 2003). The network paradigm is based on the assumption that individual behavior (and, subsequently that of a group/team) is only partly determined by personal attributes and partly determined by the social context in which the individual is embedded. Therefore, the social connections to other individuals are considered important determinants of behavior. In a meta-analysis of 37 studies, Balkundi and Harrison (2006) found evidence that social networks have a significant effect on team performance and viability. This needs to be viewed with caution, however. Firstly, networks can be found on multiple levels of the organization simultaneously. Furthermore, even at the team level, network boundaries are difficult to define and multiple networks exist simultaneously (i.e. advice, friendship, rivalry or proximity networks), with each type of network having different structural properties and effects on its actors and team outcomes. Therefore, the question "Which structural characteristics of a network have an effect on team outcomes?" needs to be asked in a specified research context.

Small group research examining this question is typically conducted in laboratory settings and is largely concerned with communication; field research is required to verify which network structures have an effect on team performance. The idea that network structure fosters cohesion and, in turn, increases performance, requires models of social processes which link network structure to individual outcomes (Friedkin, 2004:422). In laboratory settings, external factors such as role ambiguity, network history and network evolution, as well as network multiplexity, may be controlled for, while field research requires inclusion of the characteristics of the work itself (Hansen, 1999), resulting in a plethora of different work contexts in which team structure and performance were studied. In laboratory setting, on the other hand, groups are often artifically constructed in order to work on a problem that has been pre-defined by the researcher, and one best solution to the work is often available. In field settings, group formation and evolution are dynamic, and the structure of information flows (and thus, work processes and outcomes) is dependent on the composite skills and expertise that is distributed within the group. This study investigates both, antecedents and the consequences of group cohesion in a field setting.

METHODOLOGY

Social network analysis provides a method for assessing, mapping and analyzing networks of relationships between individuals. A network is the result of reciprocal, preferential and mutually supportive actions (Burt, 1992) between individuals. Thus, a social network is formally defined as a set of nodes (individual actors) that are connected by edges (relationships) (Wasserman and Faust, 1994). Social network analysis considers that observable (social) phenomena are strongly influenced by the structural characteristics of these relations and that an individual's action is driven by the structure of the network in which they are embedded (Reed, 1997:31). The study set out to explore these structural effects on the performance of hotel revenue management teams. Since the population of hotel revenue management teams is unknown, the authors applied a non-probability (purposive) sampling to identify respondents (Jupp, 2006). Personal contacts of the authors were utilized to identify hotels which fulfilled the following criteria:

1) Revenue management was part of the managerial philosophy of the hotel;
2) The hotel employed a dedicated revenue manager;
3) The revenue manager convened regular meetings with other department heads to discuss and decide on revenue management issues.

Between March and September 2010, 74 revenue management teams from international hotels were invited to participate in the study. Of these 74 hotels, 12 (16%) actively turned down the request for participation while another 22 teams (30%) did not respond to the initial call or another wave of email reminders. Two teams (3%) initially agreed to participate but were not included in the analysis due to high proportions of missing data. Eventually, 38 teams (240 respondents) were included in the analysis. Across all teams, some participants (n=15, 16%) did not fill in the survey despite prior consent and reminders. In these cases, individual actors were deleted from the team network as if their consent had been withdrawn, rather than computing their responses from the remaining ties. Team sizes range from 3 to 11, the average team size is 6.3, the median team size is 7.

The teams for this study exclusively represent the 4-5* hotels. The majority (n=34, 89.5%) of the teams work in European hotels as shown in Table 1. Group size and geographic origin function as control variables, as these may distort network effects and team effectiveness. However, performance scores were compared across groups and no statistically significant differences were found, allowing the researcher to treat the teams as one sample.

Table 1: Geographic Origin of Teams

Country	Count
Germany	12
Austria	8
Hungary	2
UAE	2
Croatia	2
Czech Republic	2
France	1
Italy	1
Slovakia	1
Spain	1
Australia	1
Switzerland	1
Indonesia	1
The Netherlands	1
Turkey	1
Romania	1
Total	38

The data were collected through a web-based questionnaire in the English language. Despite the limitations implicit in this mode of data collection (Wright, 2005), the geographical spread of the selected hotels and time constraints of respondents rendered this approach a feasible option. The web-based survey utilized a 'complete list' network elicitation approach (Marsden, 1990) in which each respondent was asked to rate the connection to every other actor in their team network on a given scale. To achieve this, the initial contact (usually the general manager) was requested to provide a list of actors in their team. The questionnaire was then adapted and personalized for each team. A link to the team's questionnaire was then mailed to the contact person who distributed it to the other team members. When necessary, one to two reminders were sent to the contact person or, upon request, to the team members themselves.

The questionnaire consisted of two main parts, which have been adapted only marginally to reflect the research context. Given the widespread use of the respective scales, the authors accepted their validity and reliability. However, the network questions were pilot tested on a team of seven employees to verify the understandability of the network questions. In this section, following the information seeking model developed by Borgatti and Cross (2003), each team member was asked to rate the strength of the ties to every other actor on a five-point scale (see Table 2 below for network questions and scales used). The second part of the questionnaire focused on the measurement of team performance. In the research context, team outputs are intangible – the aim of knowledge exchange is to allow the revenue manager to make better informed decisions. Therefore, performance was defined as behavior, rather than an outcome. For this, an instrument developed by Kirkman and Rosen (1999) was used in an adapted form. Kirkman and Rosen (1999) distinguish between team empowerment and performance. Team empowerment relates to the potential of the team to perform well and is measured in four dimensions: potency, meaningfulness, autonomy and impact. Team performance comprises two dimensions: productivity and proactiveness. All team members were asked to evaluate team empowerment, whereas team performance was evaluated by the General Manager. Finally, individual expertise was rated on the basis of experience, the respondents were asked to state the amount of formal training (in years) they had received in revenue management, and also the time they have been professionally active in the hospitality industry.

Table 2: Description of networks measured

Network Variable	**Network Question**
Knowing	I am aware of this person's knowledge and skills. This does not necessarily mean that I have these skills or am knowledgeable in these areas, but that I understand what skills this person has and domains they are knowledgeable in. *(strongly disagree – strongly agree)*
Value	This person has expertise in areas that are important to the kind of work I do. *(strongly disagree – strongly agree)*
Access	One issue in getting information or advice from others is your ability to gain access to their thinking. The extent to which you can access another person's thinking and knowledge is a continuum. At one end of the spectrum are people who do not make themselves available to you quickly enough to help solve your problem. At the other end of the spectrum are those who are willing to engage actively in problem solving with you in a timely fashion. With this continuum in mind, how would you rate your overall ability to access this person's thinking and knowledge? *(extremely weak – extremely strong)*

InfoGet	Please picture a 'typical revenue meeting'. Please indicate how often you actively turn to this person for information or knowledge on a work-related topic during the meeting? *(never – very frequently)*
InfoGive	Please picture a 'typical revenue meeting'. Please indicate how often this person actively turns to you for information or knowledge on a work-related topic during the meeting? *(never – very frequently)*

Source: adapted from Borgatti and Cross (2003).

Social network researchers deal with two families of data, relational and attribute. Relational data describe the network as a whole (e.g. network size, density and fragmentation). Attribute data relate to the individual actors and are either measured (e.g. training received) or computed (e.g. actor centrality). A structuralist perspective assumes a general correlation between both levels. In this study, expertise-related actor attributes are measured and treated as antecedents to network cohesion. Network structures can be explained in a number of ways, but each explanation is limited to the single network; alternative networks may show similar or dissimilar structural features. Relational data naturally violate the premise of independency, thus classical inferential statistics such as regression analysis are not applicable for network data. In order to test whether the observed structure is a result of certain attributes or is an occurrence of chance requires alternative models such as the Exponential Random Graph Models (ERGM).

The ERGM (p*) models were developed by Pattison and Wassermann in the late 1990s (Pattison and Wasserman, 1999; Wasserman and Pattison, 1996) and can be used to assess the likelihood of specific network configurations occurring above what would be considered pure coincidence (Shumate and Palazzolo, 2010). They thus allow the researcher to measure the effect of actor attributes on the observed network structure. The basic assumption is that the observed network displays structural features that are distinct, compared to a simulated random network of the same size (under a Monte-Carlo estimation approach). The observed network, therefore, is seen as a representation of a particular pattern of ties – one of many possible tie formations. The researcher generally does not know what caused the formation of ties in the observed network and the model functions as a hypothesis for this (stochastic) process. To successfully model social networks statistically, selected parameters are estimated from the data in a principled way (in this case, the presence of incoming and outgoing ties). Using PNet software (Wang et al., 2006), the observed networks are used as a basis for estimating the ERGMs for the range of pre-defined parameters. Estimations are conducted separately for each of the five networks (Knowing, Access, Value, Information Get and Information Give). In order to shorten computing time, all networks were analyzed simultaneously. This is possible by including a 'structural zero' file, which keeps the individual networks separate (Wang et al., 2006). In the estimation, the observed number of ties is compared with the mean number of configurations in a sample of 500 random graphs generated with the parameters of the configuration. This estimation is repeated iteratively until the model converges. If parameter estimates are at least 1.96 standard errors away from zero, the parameters are considered significant for the model on the 0.05 level of statistical significance.

In a second step, the network cohesion-performance link was tested. For this analysis, density scores were computed for each team and each of the five networks, using the UCINET 6 software package (Borgatti et al., 2002). Furthermore, individual performance evaluations were aggregated to a team-level score. Since the premise of independence of observations is not violated here, a forced-entry multiple regression model could be used, regressing team performance evaluations against the density of each of the five team networks.

Before commencing the inferential analysis, a reliability analysis of the subscales was conducted. Applying Kline's (1999) cutoff-point of $\alpha \geq 0.7$, all subscales of the questionnaire were classified as reliable. Furthermore, the deletion of items does not increase α for any of the subscales, suggesting that none of the individual items are redundant.

FINDINGS

In expert-led teams such as the ones observed in this study, one would expect that the communication activities are clustered around a few actors, rather than equally spread. Some actors are more likely to contribute to team performance, whereas other actors are more likely to be recipients of information. Table 3 below lists the professional positions in order of their rank frequency in both of the communication networks. Activity is hereby represented by the mean scores actors holding the respective positions received from all other actors in the network, i.e. the column score of the matrix.

Table 3: Ranked Column Scores for Communication Networks

Information Get Network	***Information Give Network***

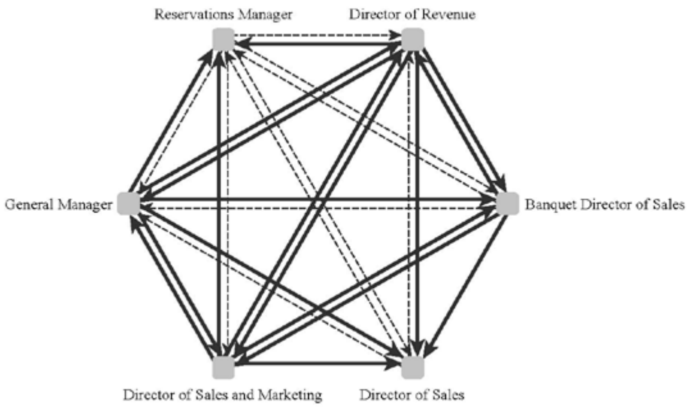
Position	**Rank**	Position
Revenue / Yield Manager	**1**	Revenue / Yield Manager
Assistant Marketing Manager	**2**	General Manager
General Manager	**3**	Sales and Marketing Manager
Sales and Marketing Manager	**4**	Reservations Manager
Conferences, Events, Banquets	**5**	Rooms Division Assistant Manager
Reservations Manager	**6**	Assistant Marketing Manager
Rooms Division Assistant Manager	**7**	Hotel / Operations Manager
Revenue / Yield Assistant Manager	**8**	Sales and Marketing Other
Hotel / Operations Manager	**9**	Finance, Controlling, Business Support Manager
Finance, Controlling, Business Support Manager	**10**	Conferences, Events, Banquets
Sales and Marketing Other	**11**	Rooms Division Manager
Food and Beverage Manager	**12**	Revenue / Yield Assistant Manager
Rooms Division Manager	**13**	Finance, Controlling, Business Support Assistant Manager
Finance, Controlling, Business Support Assistant Manager	**14**	Food and Beverage Manager
Web / IT / Distribution	**15**	Web / IT / Distribution
Assistant Reservations Manager	**16**	Assistant Reservations Manager
Front Office Manager	**17**	Front Office Manager

These results demonstrate that, as may be expected, the revenue manager is the most active position in the communication networks, although the revenue manager is notably more active in providing other team members with information than they are in receiving information from them. Other active participants besides the revenue manager are the General Manager and Marketing Manager, who support the view that revenue management is first and foremost a marketing activity and thus closest to the marketing and sales department. It is noteworthy that the department which is most affected by the work of the revenue manager, namely the rooms department, is relatively inactive in the communication networks, and the front office managers are the least active in both networks, although it is their department which has most provider-customer interaction.

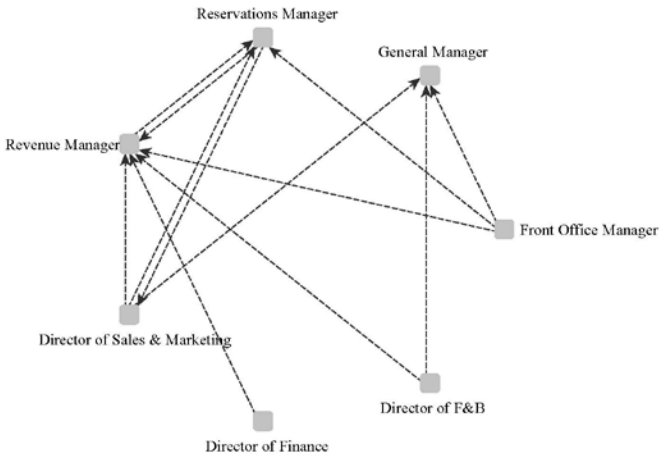
Of all five networks, the information exchange networks were found to be the most centralized, suggesting that the communication in teams is concentrated around a few participants. The intensity of information exchange was measured through valued ties. Here, it is noteworthy that in the information exchange networks few high-valued ties were reported, suggesting that, across all teams, the intensity of information exchange is moderate.

Often, network structure is best interpreted by mapping the connections. Figure 1 displays the communication network maps of two selected teams. Team A was selected for showing higher performance scores compared to the other teams, whereas Team B was selected for reporting lower than average performance scores. The networks are displayed with a circular layout to avoid misinterpretation of node location in a two-dimensional space.

Team A



Team B



Legend

Tie value 5 (frequently)
Tie value 6 (very frequently)

Network Parameter	**Team A**	**Team B**
Order	6	7
Size (values 5 or 6)	28	12
Density (valued ties, weighted)	0.878	0.286
Degree Centralization (out)	14.7%	25%
Degree Centralization (in)	10.7%	63.9%
Clustering Coefficient (weighted)	0.460	0.112
Betweenness Centralization Index	1.67%	6.67%
Average path length	5.533	8.333
Performance Scores (min=1, max=6)		
Potency	6.0	4.90
Meaningfulness	6.0	4.72
Autonomy	6.0	4.36
Impact	6.0	4.44
Productivity	6.0	2.75
Proactiveness	6.0	4.75

Figure 1: Network Maps 'Information Give'

The network maps shown in Figure 1 display the 'Information Give' networks in which the team members rated how often they provided other actors with information. Solid arrows represent a very frequent information flow, whereas a dotted arrow represents a frequent information flow. Weaker forms of communication are omitted in this network representation. As may be observed, network density appears to have positive effects on team performance: looking at Team B, the relative sparseness of strong ties is apparent, and communication is centralized around the revenue manager. The revenue manager receives information from all but the general manager, but sends information only to the reservations manager. Three out of the seven team members are only sources of information. Team A, on the other hand, shows an almost complete network. The director of revenue – whilst officially the head of the team – is no more central in the network than most of the other team members. In Team A, all actors are well embedded in the network and the scores high on most measures. For Team B, there is a lesser degree of connectivity and attitude is lower.

Figure 2 below illustrates a model of team performance. In this study, no direct effects of actor attributes on the evaluation of team effectiveness and performance were established, which suggests that, for the research context, an explanation based on agency alone does not suffice. In fact, as is evident in the model below, actor attributes initially create the structures which are observed, but it is the structure that helps explain the variances in team evaluations.

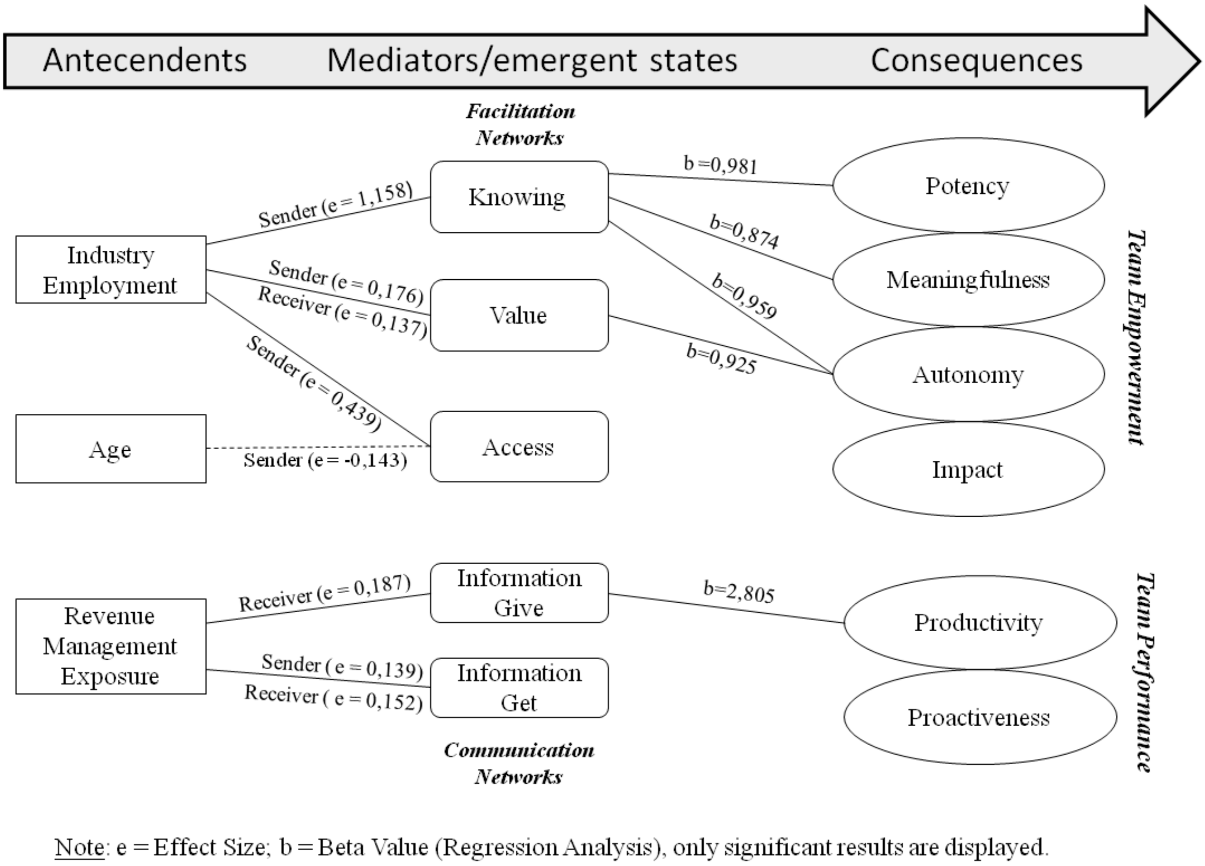


Figure 2: Model of Team Performance | Network Density

Sources of Network Cohesion

As shown on the left-hand side of Figure 2, three attributes were found to explain the formation of the measured networks: industry employment, age and revenue management exposure.

Industry Employment: Awareness of others' expertise is a necessary condition for effective information exchange since it implies that one knows where required knowledge is stored. Over time, as industry expertise is gathered, it can be assumed that actors develop a better understanding of the systems in place and the 'rules of the game' of hotel operations. The data suggest that the length of industry employment explains the emergence of ties in the 'Knowing', 'Value' and 'Access' network. Compared to the other actors in the network, one additional year of industry employment results in a 16% higher likelihood that strong (outgoing) ties to other actors in the 'Knowing' network are reported (estimate: 0.147, stderr: 0.058, t-ratio: -0.0398). Similarly, one additional year of industry employment results in a 18% higher likelihood that strong (outgoing) ties to other actors in the 'Value' network are reported (estimate: 0.162, stderr: 0.046, t-ratio: -0.0088). In the 'Access' network, this likelihood is increased by 43% (estimate: 0.364, stderr: 0.171, t-ratio: -0.0161).

Extensive industry experience also increases the probability of being perceived as a valuable contributor to team communication by other actors. For every year of industry employment, the probability of receiving a strong tie in the 'InfoGet' network increases by 14% (estimate: 0.128, stderr: 0.048, t-ratio: -0.0319).

Age: Taken as a proxy for experience and seniority, age was also found to be an antecedent to tie formation in communication networks, albeit adverse effects were also identified. Older team members are less active contributors and recipients in team communication, and gaining access to other actors becomes more difficult with increasing age. For every year of age gap between the actors, the likelihood for strong access ties decreases by 14% (estimate: -0.154, stderr: 0.075, t-ratio: -0.0334).

Revenue Management Exposure: RM exposure is the third attribute which was found to be a significant explanation for the formation of ties. RM exposure is different from industry experience as it focuses on the development of specific expertise relevant to the fulfillment of the team's tasks. As discussed previously, it was anticipated that RM exposure, and thus expertise, leads to central positions in the communication networks. The results show that one additional year of RM exposure means that the likelihood of being a regular recipient of information increases by 19% (estimate: 0.172, stderr: 0.044, t-ratio: -0.0096). It is noteworthy that actors with more extensive RM exposure are also more likely (14%) to turn to others for information (estimate: 0.130, stderr: 0.040, t-ratio: 0.0234), but they are not significantly more likely to provide other actors with information.

Network Cohesion-Performance Link

Turning to the consequences of network cohesion, the link between network density and team performance was studied in a series of regression analyses and the beta values are shown on the right-hand side of Figure 2. A dense 'Knowing' network means that the awareness of other actors' expertise is high; a dense 'Value' network shows that actors are dependent on each other's expertise. A dense 'Information Give' network reflects high levels of knowledge exchange in the group. The facilitation networks 'Knowing' and 'Value' explain team effectiveness to a large degree, whereas the team performance can be explained by the density of the 'Information Give' network. Access to other members' knowledge was found not to be significant in explaining variance in team effectiveness. Furthermore, 'Impact' as a measure of team effectiveness and ‘Proactivity’ as a measure of team performance were not explained by any of the gathered networks.

DISCUSSION

This study provides empirical support for the often-posited view that effective revenue management is first and foremost a result of coordinated knowledge exchange and communication (Hansen and Eringa, 1998; Jones and Hamilton, 1992). It extends the view of knowledge being a resource used in RM (van der Rest, 2006) by highlighting that the extent to which the actors are connected to each other is equivalent to the potential volume of resources that can flow through the network. The view of earlier authors (Van Knippenberg and Schippers, 2007) that diversity enhances group cohesion could not be fully supported in this research context. Through the identification of antecedents for group cohesion, it could be shown that seniority and expertise funnel communication flows towards individual actors, in consequence, they add to heterogeneity. While, for some work teams, heterogeneity has positive effects on work outcomes (Delgado Pina et al., 2008), this is not the case for the RM teams under study. Since effective RM is dependent on the quality of decisions made in the team (rather than the team’s ability to generate innovative outputs), group cohesion can be best reached by a concentrated communication exchange where individual expertise is considered.

On the one hand, performance, as an output-oriented construct, was shown to be driven by communication intensity. As exemplified by contrasting two teams (see Figure 1), it can be posited that teams with active information exchange seem to have a performance advantage over teams which communicate less. In other words, low-performing teams underutilize the potential of shared cognition. However, a mere focus on increasing communication levels among team members may be short-sighted as it ignores the *ability* of a team to perform well, or team empowerment. Sustainable team performance is dependent on the impact of team work on the individual member as well as the potential for future team performance. In the present research context, team empowerment could, to a degree, be explained by the density of the knowing network. In combination, this suggests that team performance is dependent on a) the ability to create a communication structure which is conducive to information flow, and b) to manage the flow of knowledge given the constraints of the network.

It appears fruitful to facilitate information exchange among all team members and to generate strategies and tactics based on knowledge which is distributed among team members rather than relying on the expertise of one or few. To foster this, one cannot only rely on the professional expertise of the revenue manager, but should train all participants in the matter. Such balancing of the heterogeneity of expertise is likely to increase the potential for more active communication among team members, a structural characteristic that was found to positively contribute to both team effectiveness and team performance. As an active leader, the revenue manager also needs to find ways to overcome communication barriers. This issue needs to be overcome by the team leader, as the awareness of individual expertise and access to knowledgeable team members is a necessary condition for knowledge exchange and, in consequence, the evolution of shared expertise (Martin Cruz et al., 2007). Essentially, such concerted action would contribute towards the integration of revenue management practices into the overall business structure, an issue that has been raised critically before (Ivanov and Zhechev, 2012; Karadjov and Farahmand, 2007).

FUTURE RESEARCH

The current study used team-level network data. Future work in this direction could place a special focus on the revenue manager and other positions in the network. By looking at the data as a set of ego-networks of the revenue manager, the authors should be able to draw conclusions about the effects of individual network positions on team performance. Additionally, the study may be extended by including non-human actors such as revenue management systems and other knowledge depositories in the network. By doing so, researchers would be able to study combined effects of human-human and human-machine interaction on knowledge exchange, information search and decision making.

Future studies of team performance can profit from personal data collection in two ways. For one, the researcher's experience of the situation, the qualia, can be made an explicit component of the data. By becoming a part of the research context (e.g. through meeting participation), the researcher can note the tone, duration and context of the conversation and thus be able to draw inferences on the quality of information transmitted. Researchers may also be able to judge the impact of the meeting setting, individual team member behavior and their body language. Lastly, in dealing with the organization as a whole, the researcher can bring the results of the team observation into an organizational context. The second advantage of personal data collection is that the researcher can build a rapport with the respondents and, as a consequence, data validity is likely to increase.

CONCLUSION

Since the advent of revenue management in the hospitality industry, the role of the revenue manager has changed from the position of a mere analyst contributing to price setting and capacity allocation decisions to a central decision maker and communicator. Although differences in organizational structure still persist, voices in the popular media call for an increased leadership role for revenue managers. An apparent shift of power from the sales and marketing department to the revenue manager, combined with advances in holistic revenue management strategies, requires that leadership, management and communication skills become increasingly important for RM success. Equipped with the findings of this study, revenue managers are now in a better position to manage expertise in the team and to actively control the flow of resources (information) within the team. This by no means diminishes the centrality of the revenue manager. In fact, the analysis of team structures showed that much of the communication is centralized around the revenue manager, a situation that is not necessarily detrimental to performance. However, more of the relevant knowledge should be deposited with the team members. Then, the revenue manager could occupy the role of an information broker, thus conducting information exchange and channel communication flows rather than simply being a sink of information.

In summary, as opposed to many earlier studies of team performance, this study applied a structuralist perspective in which it was assumed that individual attributes are not simply input factors to team processes, but are in fact shaped by circular social contagion processes. The structuralist lens has proven fruitful in detecting some of the mechanisms of team communication and thus provides an additional perspective to earlier attribute-based work on team performance. Here, social network analysis and, particularly, recent advances in network modeling approaches appear to be promising means of team and performance research.

LIMITATIONS

Primary data collection is traditionally difficult in hotels and often only works within a trust-based relationship between the researcher and the informant. The study set out to investigate communication networks, which may be perceived by some respondents as personal intrusion and therefore can create outright refusal or false responses. The need for a trust-based relationship between researcher and respondent, combined with demanding sampling requirements, meant that teams could only be obtained for this study through personal contacts and recommendations, resulting in a purposive sampling. Inherent in this sampling procedure is a sample which is skewed towards positive performance, i.e. a self-selection bias is likely to have occurred. It appears reasonable to argue that dysfunctional teams were less likely to participate in this study since it was communicated that team performance was one of the core measurements. A social desirability bias may affect tie reporting, where respondents rate their communication behavior (and, particularly their role as information source) more positively than it actually is. Also, tie formation does not occur in an emotional vacuum. The scope of interpersonal communication is partly dictated by organizational needs as well as personal affection. Interpersonal conflicts within teams are likely to influence tie formation, and so does friendship. Such emotional states are not taken into account when an online survey is utilized and the researcher does not have direct contact to the respondent.

Second, this study suffers from the same limitation as all studies with a cross-sectional research design. The results are only momentary snapshots and should in fact only be interpreted within this timely context. Particularly those studies which analyze human behavior are prone to neglecting the effect the limited timeframe has on the responses of the actors. Finally, whilst team size was controlled during the analysis, other potential external factors were not included in this study. Effects such as organizational culture, hotel size, or organizational structure are likely to impact the formation of communication networks as well. Team composition and communication is likely to reflect the hierarchical structure of the hotel and the degree to which the decision making processes are dictated and controlled by the company's headquarter or regional directive. The size of the hotel commonly determines the departmental division which, in turn, dictates the potential for revenue management team configuration.

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