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**Exploring the Impact of Internal  
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# Exploring the Impact of Internal Social Media Usage on Employee Engagement

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## ABSTRACT

*The emergence of internal social media platforms/applications is creating opportunities for organizations to promote collaboration between employees and to improve employee engagement. Internal social media applications provide employees with an easy way to communicate and share personal and professional information with other co-workers. A number of research initiatives have explored the technical side of internal social media but little research has been conducted to explore its potential in enhancing organizational performance through a more empowered workforce. This paper explored the relationship between internal social media usage and employee engagement within the North American operations of a multinational organization. The relationship between the level and purpose of internal social media usage and company-wide self-reported competencies was also explored. Data was collected from 1694 employees and the study revealed variations in both internal social media usage and employee engagement by business division and career bands. Tasks being addressed by internal social media were also identified. The results showed that the greater the self-reported usage of internal social media, the greater the levels of self-reported employee engagement. The results provide preliminary evidence that internal social media usage is associated with the level of employee engagement. Also, internal social media usage is associated with the level of self-reported competencies of entrepreneurship, communication, and readiness for change.*

## KEYWORDS

Human resources, internal social media, internal social networking, enterprise social networking, employee engagement, collaboration, internal communication, organizational performance.

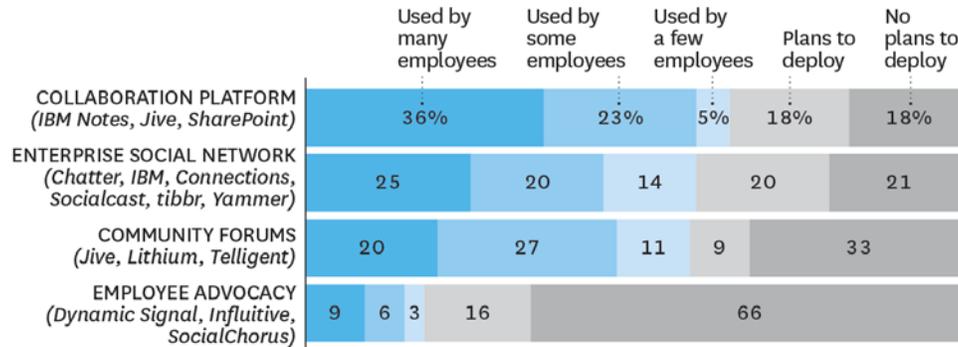
## INTRODUCTION

Martin (2013) reported that on average, in 2010, each of the Fortune 500 companies has adopted more than one social media platform. By 2016, it was predicted that 50 percent of large organizations will have internal Facebook-like social networks (Gartner, 2013). Due to the rapid expansion of internal social media adoption, several attempts have been made to unlock the potential benefits that this increasingly important tool brings to organizations (Jarrahi and Sawyer, 2012). The use of social media technologies has increased across organizations as executives and managers attempt to leverage the power of the information and knowledge that exists within their companies (Leonardi, 2015). Social media continues to gain ground in the enterprise for a wide range of business purposes (Mark et al., 2014). Gartner predicted that social media will transform communication and data-sharing in the enterprise. It was predicted that by 2016, internal social media will achieve as much importance within the organization as email and the telephone have contributed (Gartner, 2013).

Chui et al. (2012) explored the potential impact of internal social media use within four commercial sectors: consumer packaged goods, retail financial services, advanced manufacturing, and professional services. The research revealed that these social media technologies, which create value by improving productivity across the value chain, could potentially contribute \$900 billion to \$1.3 trillion in annual value across the four sectors. A major part of the research on internal social media focuses on the assessment of its success, key factors for successful implementation, and potential areas for improvement. Another major research stream shows the many individual and competitive advantages that accompany the usage of internal social media such as supporting communication, promoting collaboration-enhancing relationships between colleagues, and improving the individuals' and organizations' knowledge base. These advantages may lead to more innovation, higher morale, lower cost, reduced turnover, and greater productivity (Buettner, 2015). Social networking sites have been widely studied from a consumer perspective; however, far less research has addressed the challenges and opportunities these sites present

## Internal Social Media Usage

to organizations (Rooksby and Sommerville, 2012). Leonardi (2015) suggests that further research should examine how individuals approach others to ask for knowledge, or how the transfer of knowledge actually occurs. Leonardi also questioned whether an individual's communications provide sufficient cues for their coworkers to infer the areas in which they are knowledgeable or whether they need their colleagues to be more open about communications activities and behaviors. Buettner (2015) also noticed that people report high usage intention combined with high ratings on perceived usefulness and low on privacy concerns, or a low usage intention combined with low usefulness and high privacy concern ratings. Figure 1 below shows the results of an Altimeter Group survey of 55 companies, which revealed that employees are not widely using their corporate social networks (Altimeter Group, 2014).



**Figure 1. Different corporate social network usages. (Source: Altimeter Group, 2014)**

Understanding the role internal social media may play in fostering employee engagement is in its infancy. Leonardi, Huysman and Steine (2013) explain that to date, most studies of internal social media have been conducted by scholars within the computer-supported cooperative work (CSCW) and human computer-interaction (HCI) communities. Not many studies have looked at how internal social media usage impacts employee engagement and overall organizational performance. There is, however, considerable research that demonstrates that employees see value in social media (Shami, Nichols, and Chen, 2014). Mark et al. (2014) reported that few studies have examined how data from social media platforms could be used to understand organizational behavior. Huy and Shipilov (2012) wrote that many companies have either not used internal social media applications or have failed to optimize their use within their organizations. Williams (2013) reported that despite significant interest in, and widespread adoption of, internal social media, along with clear expectations of continued growth in the internal social media market, organizations remain uncertain about business contributions and long-term management challenges of internal social media. Nelson et al. (2011) suggested that internal media users are drawn to different levels of contribution depending on their roles in the organization and that different platforms/applications may have their own adoption patterns in an organization.

This study addressed whether there was a relationship between an employee's use of internal social media tools and the level of employee engagement. The relationship between an employees' usage of Bosch Connect and their performance on four self-reported company-wide competencies was explored next. Employee usage and their engagement practices were studied as well. The study endeavored to provide possible indications about how internal social networking is working and also highlights possible reasons why such networking may not be working. Descriptive statistics were used to address the first research question (RQ) below while inferential tools framed by hypotheses were used to address the remaining RQs.

*RQ1: What is the extent of use of Bosch Connect and what apps are receiving the most use?*

*RQ2: How does the level of Bosch Connect usage impact the level of employee engagement?*

*RQ3: What is the impact of Bosch Connect usage on a number of self-reported competencies?*

*RQ4: What is the relationship between the level of employee engagement and self-reported competencies?*

This paper continues by addressing background and related work, summarizing the literature regarding the overall use of social media within workplaces, followed by an overview of internal social media. This section also provides

## Internal Social Media Usage

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a brief exploration of efforts that address both employee engagement and internal social media. The methodology section presents the adopted research methodology and data collection tool, including information about the conducted pilot study. Research results are presented next, followed by a discussion of the findings. Finally, this article ends with conclusions and proposed future research thrusts.

## BACKGROUND AND RELATED WORK

### Public social media in the workplace

Social media consists of a set of tools that enables users to become aware of and react to real-time information and evolving content. Kaplane and Haenlein (2010, p.61) describe this scenario as “a group of internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content.” The number of social media users is growing rapidly and, for example, as of January 2014, Facebook had a total of 1.19 billion active users monthly with an annual growth rate of 18 percent (Aichner and Jacob, 2015).

A mere 18% of managers believe social media is important for their business today, whereas over 63% predicted that social media will be an important part of their business within three years (Kane et al., 2014). Jennings, Blount and Weatherly (2014) indicated that 73.3% of 262 participants, who were employed in a wide range of US industries, used social media for business related purposes; 100% of these same participants reported that they used social media for personal purposes. These statistics indicate that internal social media use is extensive for business purposes but not up to the same level as for personal use.

Beyond standardization, social media platforms facilitate transparency and both active and passive participation (Tierney and Drury, 2013). However, the use of social media within the workplace has seen a slow start and many organizations initially took measures to limit its use. Fifty-four percent of 1,400 Chief Information Officers of various organizations confirmed that their organizations were banning access to social media within their organization (Duban and Singh, 2010). Reporting on a survey conducted by the Society for Human Resource Management, Buttrick and Schroeder (2012) concluded, among other things, that 43% of companies surveyed blocked access to social media platforms on company computers and hand-held devices because of potential risks created by employee use. Parker, Harvey and Bosco (2014) state that social media use within the workplace was seen as disruptive and to negatively impact productivity and blocking social media sites could be the solution. According to Dougherty (2013), 77% of employees who have Facebook spend at least an hour using this social medium during work hours. Diercksen et al. (2013) report that UK employees spend an average of 40 minutes on social media every day. With 57% of the surveyed employees using social media for personal use in work hours, this could cost companies over \$2.5 billion. Chui et al. (2012) indicate that the average interaction worker spends an estimated 28% of the workweek managing e-mail and nearly 20% looking for internal information or tracking down colleagues who can help with specific tasks. Potential risks associated with the employees' use of social media during work hours may include wasting time at work, behaving unprofessionally, leaking/disclosing of confidential information (Silnicki, 2007), and posting negative comments about the company. Jennings, Blount and Weatherly (2014) report the 76% of 141 public and private companies surveyed indicated that they do not have a social media policy. Cairo (2014) advises that, to ensure correct use of social media and prevent lost productivity, organizations must develop a social media policy, engaging employees in the process. Parker, Harvey and Bosco (2014) recommend developing a social media policy that may include limiting using social media for personal purposes.

### Internal or enterprise-based social media

The notion of Internal Social Media first emerged in a conference in 2004 (O'Reilly, 2005). McAfee (2009) stated that enterprise social media are free and easy platforms for communication and interaction. Wang and Kobsa (2009) explain that there are two types of online social networks that may be used at work and it is important to understand the difference between them. The first type is general social networking sites that are open to the public for registration, e.g., Facebook, LinkedIn, etc. The second type is enterprise social networking sites that are internal to the particular company and thus only open to its employees, e.g., IBM (DiMicco et al., 2009). Enterprise 2.0, or internal social networking, is a combination of three elements; technology, social interaction, and content

## Internal Social Media Usage

development/management aiming to improve an organization's business processes. The five capability areas for Enterprise 2.0 are communication, collaboration, community, construction, and search (Duban and Singh, 2010).

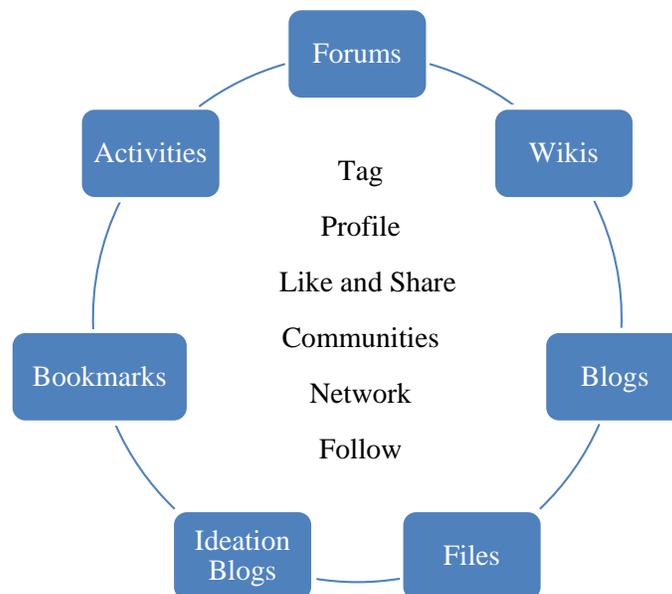
Buettner (2015) defined internal social media as a social networking site that is operated by a company, whose access is restricted to members of this company and that offers the members of the company the possibility to set up a personal profile and to connect with other members of the company. These sites may include the following tools: social networks, wikis, forums, people tagging, file sharing, user profiles, blogs, microblogs, activity feeds, group support, tagging, tag clouds, RSS feeds, photo and file repositories, discussion threads and more (Mark et al., 2014; Holtzblatt et al., 2013).

Leonardi, Huysman and Steine (2013) described what workers can do on internal social media platforms as follows:

1. Communicate messages with specific coworkers or broadcast messages to everyone in the organization
2. Explicitly indicate or implicitly reveal particular coworkers as communication partners
3. Post, edit, and sort text and files linked to themselves or others
4. View the messages, connections, text, and files communicated, posted, edited and sorted by anyone else in the organization at any time of their choosing

Enterprise social media can help facilitate innovation management. For example, Tierney and Drury (2013) explained that a company with internal social media technology enabled a process improvement by providing a single, easily findable template which eliminated the problem of staff trying to locate different, difficult-to-find templates for different technology innovation areas or business units.

As an example, at Robert Bosch Company an internal social media toolkit called Bosch Connect is used. As shown in Figure 2 below, this toolkit includes forums, wikis, blogs, files, ideation blogs, bookmarks, and activities. Participants can tag, create a profile, like and share, contribute to communities, network with fellow workers, and follow what is posted.



**Figure 2. Components of the Bosch Connect network used by North American Robert Bosch LLC**

Lee and Xue (2013) highlighted a number of advantages that organizations can gain from internal social media networking. For example, employees remain focused on corporate objectives and can share resources and information easily and effectively. The ability to communicate issues, insights, and solutions leads to an empowered workforce and fosters innovation. Internal social media networking provides top management with direct access to

## Internal Social Media Usage

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posted suggestions and this helps in decision-making processes. Management can easily search for and consolidate employee skill-sets to match to a specific project requirement. Studies by IBM researchers on Beehive have demonstrated that social networking tools enhance staff's social capital by expanding social networks, strengthening existing ties, and enhancing staff's connection to the organization (Holtzblatt et al., 2013).

There are, however, possible risks associated with the use of internal social media that may include: spam and virus attacks, data and identity theft, lost productivity (especially if employees are busy updating profiles), and posting negative comments either about other employees or the company (Lee and Xue, 2013). Regardless of these risks, and according to Huang, Singh, and Ghose (2015), social media technologies enable firms to improve organizational performance by supporting not just inward facing collaboration but also to come together to respond to customer support, innovation, and sales and marketing opportunities. The expansion of the implementation of internal social media platforms and the additional capabilities that they may provide make it essential to continue to study their impacts on the organizations where they exist.

## Employee engagement

The term employee engagement has gained considerable popularity in the past 20 years yet it remains inconsistently defined and conceptualized (Shuck and Wollard, 2010). Baumruk (2004) referred to engagement as the energy or the passion that employees harbor for their jobs and their employer, which result in emotional and intellectual commitment to their organization. Richman (2006) described engagement as an impetus for an employee to employ his/her discretionary efforts, experience, and energy, which engender generating creative solutions that, in turn, directly benefit the employers without any explicit assurance of personal gain. "Engagement ultimately comes down to people's desire and willingness to give discretionary effort" to their jobs (Frank et al., 2004, p. 16).

Richman (2006) and Shaw (2005) pointed out that engaged employees have high degrees of involvement and attachment to their employers and/or organizations. Employee involvement "seeks to increase members' input into decisions that affect the organization performance and employee well-being." Four key elements associated with employee involvement include "power..., information..., knowledge and skills... [and]...rewards" (Cummings and Worley, 2008, p. 351). Robinson et al. (2004) argued that the definition of employee engagement overlaps with well-established constructs such as organizational commitment and organizational citizenship behavior. Shaw (2005) acknowledged that there is a myriad of dimensions or constructs associated with employee engagement because the concept of employee engagement emanates from interactions of unique individuals under diverse work conditions. This breadth necessitates the need for focusing on only a few key dimensions or constructs. Gill (2012) proposed the following dimensions for employee engagement: alignment with the organization, management effectiveness, salary and compensation, communication, and opportunity for development and recognition.

Kahn (1990), in his much cited paper, described an employee's "personal engagement" as "the harnessing of organization members' selves to their work roles; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performances" (p. 694). However, Gatenby et al. (2008) and Gill (2012) pointed out that a formalized definition of employee engagement remains elusive. Several studies however have attempted to both define employee engagement and understand the cause and/or effects of employee engagement. These studies can be used to deduce a fairly well-grounded understanding of employee engagement. Woodruffe (2006) categorized these needs as compensation package, job satisfaction, and employability potential. Furthermore, he highlighted that vertical and horizontal communication is a key facet of employee engagement. Employee engagement was defined as a "heightened emotional connection that an employee feels for his or her organization, that influences him or her to exert greater discretionary effort to his or her work" (Gibbons, 2006, p. 4). Soldati (2007) concluded that eight drivers of employee engagement include: trust and integrity, nature of the job, line of sight between employee performance and company performance, career growth opportunities, pride about the company, coworkers/team members, employee development, and relationship with one's manager.

Peters (2007) explained that employee satisfaction is related to the level of contentment or happiness a person assigns to attributes of their job/position, their organization, and the general or overall way they feel about their employment. Nink and Welte (2011) classified the 12 questions that Buckingham and Coffman (1999) used to measure employee engagement in a hierarchal order. They classified Questions 1 and 2 as basic needs. The next

## Internal Social Media Usage

level – management support – consisted of Questions 4 through 6. Teamwork forms the next level and it consisted of Questions 7 through 10. Questions 11 and 12 formed the top level called growth. This study has used these 12 questions as the foundation for measuring employee engagement; however, the question regarding compensation was not included as an item in the final instrument since it was of no interest to the company. Some items were modified to reflect the organization’s strategic organizational objectives.

### Specific organizational competencies

Von Krogh and Roos (1995) posited that the term “competence” is a concept that is related to a broad range of individual capabilities related to craftsmanship, specialization, intelligence, and problem solving. One of the challenges involved in defining organizational competences is the attempt to include both the notion of knowledge (know-how) and action (skill application) at the same time (Edgar, 2008). Edgar also suggested that organizational competences are categorized into four perspectives:

1. Specific phenomena and their related disciplines
2. Technologies such as computing, printing, or internal combustion and its related products
3. Functional skills
4. Integration of technology and skills

Robert Bosch has adopted four competencies that are tracked for all employees. They are: entrepreneurship, leadership, communications, and readiness for change. Since the definitions of these competencies were well-known to the employees, self-reported ratings of these competencies were used to form the construct that addressed competence.

## CONCEPTUAL MODEL

As shown on Figure 3 below, increased internal social media usage may play a key role in enhancing employees’ communication, innovation capabilities, collaboration, and retention. The belief is that more engaged employees can communicate and manage their work tasks more effectively, align their work goals more with the overall organizational goals and strategies, and develop more recognition and get better compensation. If the use of internal social media leads to more engagement, then it seems likely that there will be a corresponding improvement in areas such as: productivity, profitability, safety, customer satisfaction, turnover, and absenteeism. Since past studies have established a clear positive relationship between Employee Engagement and Business Outcomes, an examination of the relationship between internal social media usage, employee engagement and employee competence on four specific company-wide competencies was pursued. Such an investigation may have implications for management and human resource practices within the company.



Figure 3. Internal social media usage, employee engagement, and self-reported competence

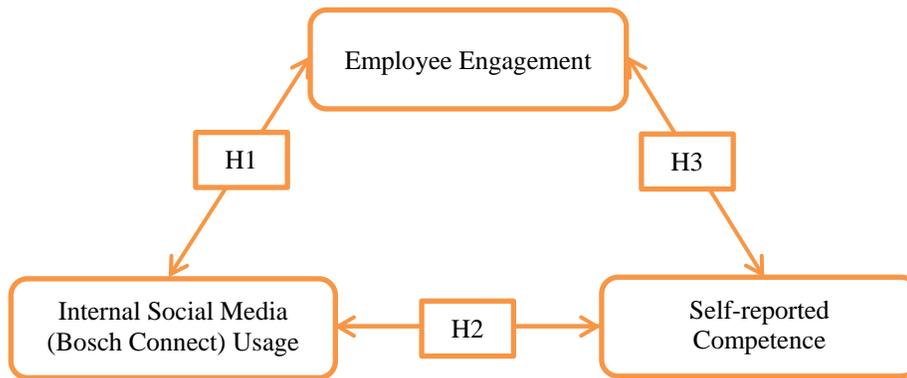
## Internal Social Media Usage

As presented in Figure 3 above, the impact of internal social media usage on employees' engagement is still unclear. Figure 4 depicts the conceptual model that was used to guide the inferential portions of this research and addressed research questions 3-5 of this study. The hypotheses tested included:

Ho1: There is no significant relationship between the frequency of Bosch Connect usage and the level of employee engagement based on the perceptions of employees.

Ho2: There is no significant relationship between the frequency of Bosch Connect usage and the level of self-reported competence measured by the organization annually.

Ho3: There is no significant relationship between employees' self-reported competence and employees' engagement levels.



**Figure 4. Research model and hypotheses**

## METHODS

To understand the relationship between Bosch Connect usage and employee engagement, a descriptive research methodology approach was adopted. In addition to a small number of demographic variables, respondent perceptions were gathered regarding the frequency of use of internal social media, the level of employee engagement, and the level of self-reported competence regarding each of the company-wide competencies.

### Instrument development

An online survey was developed, reviewed, piloted, revised, and sent to 5488 employees working within five main divisions in Robert Bosch North America. Total responses were 1802, with 1694 being usable entries. A thirteen-question (44 individual responses required) survey was used to gather data and was administered electronically using the SurveyMonkey.com website. All questions were close-ended: either multiple-choice, yes/no, or five-point Likert-type scale; the square brackets used below identify comments that were not a part of the survey. The following questions were included on the survey:

1. How many years of full-time professional work experience do you have?
2. How many years of full-time professional experience do you have at Bosch?
3. In which division of Robert Bosch LLC do you currently work (as of January 1, 2015)?
4. What is your career band level?
5. What is your assigned Bosch location?
6. Compared to your peers, how would you rate yourself on each of the following competencies? (Entrepreneurial mindset, Leadership, Communication, and Readiness for change/adaptability)
7. Which of the following statements applies to your relationship with Bosch Connect? (Use it, do not have time, do not use it, do not know how, and have not heard about it).

## Internal Social Media Usage

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8. On the following scale, please indicate how often you use Bosch Connect? (daily, weekly, monthly, less often than monthly)
9. Please respond with either a Yes or No to each of the following items.
  - Bosch Connect provides an easy way to submit, discuss, develop, and track new ideas.
  - With Bosch Connect, my communication and collaboration across departments, business units, divisions, etc. has increased.
  - With Bosch Connect, collaboration efficiency in my team (department, project) has increased.
  - With Bosch Connect, being connected with associates outside one's team has improved my work efficiency.
10. I use Bosch Connect to: [respondents were asked to choose one or both of the following]
  - Follow relevant information (delivered by my network contacts, communities blogs, forums, etc.)
  - Contribute (e.g.: share information, comment on or recommend existing content) in relevant venues
11. For which purposes/business processes do you use Bosch Connect? [seven options were provided]
12. On the scale provided, please indicate below how often you use each of the Bosch Connect apps/features by clicking one choice for each app/feature. [Eleven applications were included and the request was to rate their use on a five-point agreement scale.]
13. Indicate your level of agreement with the following nine statements: [using a 5-point Likert scale]
  - Employee Engagement Construct Items
  - I know what is expected of me
  - I have the materials and equipment needed.
  - I have the opportunity to do best every day
  - Someone encourages my development at work.
  - My opinions seem to count at work
  - Vision and mission make my work important
  - Vision and mission updated with employee input
  - Success factors for NA guide my efforts and improve
  - I am happy with my work

Several of the questions (or “items”) were used to form three “constructs.” The employee engagement construct is represented by the nine items in Question 13. The competence construct is comprised of the four self-rated competencies queried in Question 6. The internal social media usage construct is composed of three items. The first is the frequency of usage (Question 8), the second consists of a compilation of the reported app/tool usage (Question 12), and the third consists of the reasons for using Bosch Connect (Question 11).

A pilot study was conducted to help ensure an appropriate readability level, estimate the reliability, and obtain some idea regarding the relevance of the survey questions based on the respondents’ perceptions. A SurveyMonkey link accompanied by instructions was sent to 28 employees working in different bands across four divisions within Robert Bosch North America to check the structure, accuracy, and wording of the survey questions. Twenty-two participants provided complete responses to the pilot instrument. A number of comments were provided by the respondents regarding the wording of individual items and based on these comments; changes were made in the wording of the instructions and items within the final questionnaire. Additionally, based on a specific suggestion provided by a pilot study participant regarding confidentiality, an option to print out and mail the survey to an address at the cooperating university was embedded in the online survey. Fewer than ten respondents selected this option. These mailed responses were added to the database generated from those who used the online form.

### Data collection

A dedicated email account was set up on Eastern Michigan University’s server to provide a method for potential respondents to contact the research team directly. The head of human resources for Robert Bosch LLC sent an email to 5,488 employees from 5 preselected business areas. The email included background information, relevant instructions, contact information and a link to the survey instrument. The survey was made available via

## Internal Social Media Usage

SurveyMonkey.com. Reminders were sent on two occasions and the data were collected over a three-week period. Employees who did not have access to the internet were provided a paper version of the survey instrument along with prepaid and preaddressed envelopes. Upon completion of the data collection, all data were coded and input into a spreadsheet for further analyses.

## RESULTS

The average work experience reported by the 1694 respondents was 23.23 years, while the average years with Bosch was 12.75 years. Respondents represented 41 locations in the U.S., with the largest concentrations being in South Carolina, Illinois and Michigan. Additionally, 53 respondents, although assigned to divisions within these locations, were working elsewhere embedded within suppliers or on special assignment at other worldwide locations. The data distribution generally is representative of employee distribution in the region. Respondents worked for five different business areas as shown in Figure 5. Respondents were divided into three career band levels as follows as shown in Figure 5. Almost 60% of the respondents were from the exempt band while 26% and 16% represented the management and non-exempt bands respectively.

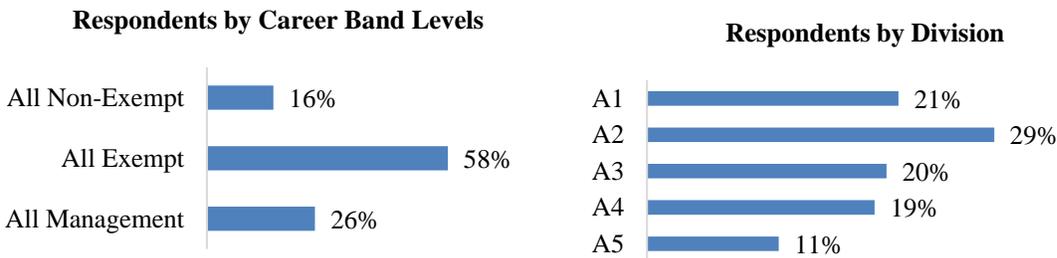


Figure 5. Respondents by divisions and career band levels

### Construct validity

A Cronbach alpha was calculated for each of the three constructs and for the overall questionnaire to obtain an estimate of the reliability. Table 1 provides the values for each of the three constructs.

Table 1. Reliability estimates for the key constructs

Construct	Number of Items	Cronbach's alpha coefficient
Self-Reported Competencies	4	.709
Internal Social Media Usage	3	.783
Employee Engagement	9	.889

An exploratory factor analysis was conducted in an attempt to ensure that the employee engagement and self-reported competence constructs were coherent and that threats to construct validity had been minimized. A principal components analysis with an equimax rotation yielded three factors that were consistent with the three constructs.

As can be seen in Table 2, the four self-reported competencies formed one factor with loadings that ranged from .686 to .803. The items that addressed the use of Bosch Connect formed another factor with all loadings exceeding .800. The last factor addressed the degree to which the employee was engaged in the work at the company and the loadings ranged from .601 to .768. Since all loadings are relatively high and the extracted factors corresponded to the groupings of the initial construct items, there is strong evidence of construct validity.

### Results of internal social media usage

Among the 1694 surveyed employees, approximately 34% reported they used Bosch Connect and 38% stated they did not have time to use it. Twelve percent chose not to use it, 15% did not know how to use the tool, and 2% had

## Internal Social Media Usage

not heard about Bosch Connect; see Figure 6. Overall, 83% of the surveyed employees knew about Bosch Connect while 17% either did not know how to use it or had not heard about it.

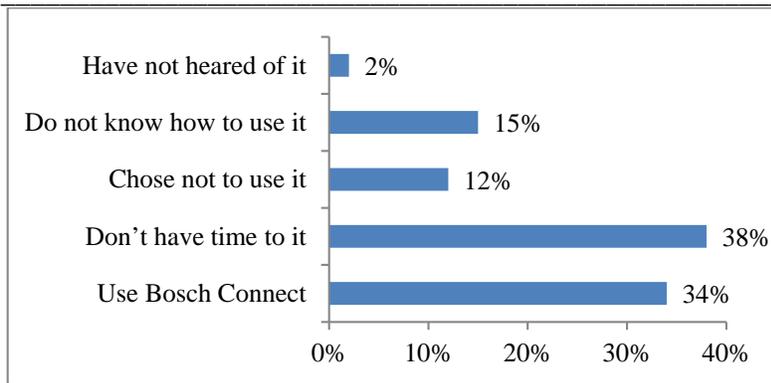
**Table 2. Factor loadings for items representing each construct**

Questionnaire Items	Constructs		
	1	2	3
<u>Self-Reported Competencies Construct Items</u>			
Entrepreneurial competence			0.721
Leadership competence			0.803
Communication competence			0.704
Readiness for Change competence			0.686
<u>Internal Social Media Usage Construct Items</u>			
How often do I use Bosch Connect		0.848	
Number of apps/tools used (compilation)		0.893	
Number of tasks addressed with these apps/tools (compilation)		0.853	
<u>Employee Engagement Construct Items</u>			
I know what is expected of me	0.601		
I have the materials and equipment needed.	0.699		
I have the opportunity to do best every day	0.764		
Someone encourages my development at work.	0.718		
My opinions seem to count at work	0.764		
Vision and mission make my work important	0.781		
Vision and mission updated with employee input	0.717		
Success factors for NA guide my efforts and improve	0.746		
I am happy with my work	0.768		

When the respondents who use Bosch Connect were asked how often they use it, 32% reported using it daily; this represents 11% of the entire sample (both users and non-users). Forty-nine percent reported weekly use, which represents 16% of the surveyed 1694 employees. Fifteen percent stated they used Bosch Connect monthly and 4% indicated they used it less than monthly. This represents 5% and 1% of the entire sample respectively. When employees were asked if they used Bosch Connect to follow relevant information (delivered by network contacts, communities blogs, forums, etc.), 91% answered “yes.” However, when they were asked if Bosch Connect was mainly used to contribute (e.g., share information, comment on, or recommend existing content) in relevant venues, 64% answered “yes.”

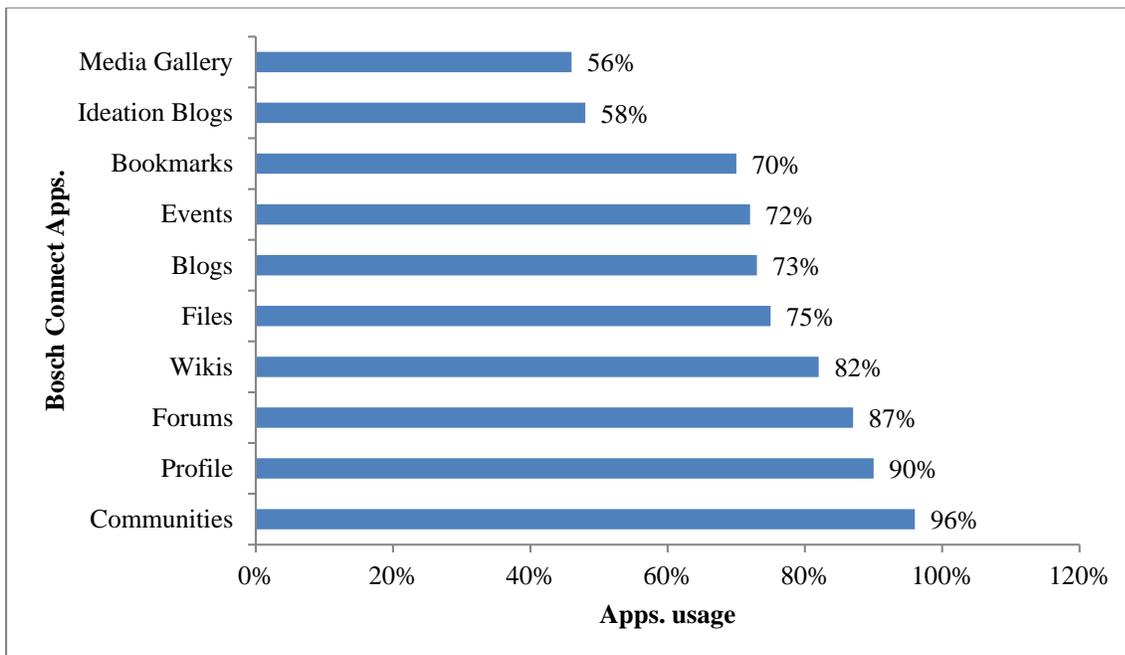
Furthermore, among the 573 employees who used Bosch Connect, 80% indicated they used the tool to collect, combine, and communicate information. Sixty-six percent used it to find experts, discover new ideas, and obtain support. Fifty-two percent used it for continuous improvement purposes and 32% used the tool for evaluating options/decision making. Twenty-two percent of employees who use Bosch Connect reported that they used it for organizing/attending meetings and 20% used it for self-organized task assignment. Twelve percent used the tool for other purposes.

## Internal Social Media Usage



**Figure 6. Who uses Bosch Connect among the respondents?**

Different applications within Bosch Connect were used to different degrees. For example, Communities was the most used with 96% of the users stating they used this application. The least used two applications were the Ideation Blog with 48% and the Media Gallery with 46%. Usage percentages for all of the applications are shown in Figure 7.



**Figure 7. Bosch Connect applications usage**

## Internal Social Media Usage

### Results of employee engagement

The employee engagement ratio differed among the four main business divisions. The A4 division had the lowest employee engagement ratio at 4.69. The A2 division had a ratio of 5.17, while the A3 and A1 divisions had the highest ratios of 7.25 and 8.24, respectively. No ratio is reported for division A5 because this was not a specific division but a group of respondents who selected “Other” in response to identifying the department for which they work.

Employee engagement ratios differed among career band levels, as well. The non-exempt band had the lowest employee engagement ratio at 5.33. The exempt and management career bands had the highest ratios of 6.13 and 6.24, respectively. These statistics bring the overall employee engagement ratio at Bosch to 6.02, which is a very high ratio compared to the average industrial employee engagement ratio of 1.83 (Gallup Consulting, 2008).

All respondents were asked to report their agreements with the nine employee engagement statements (Question 13 in the Instrument section above), including three statements about the company’s visions and statements that were removed; the remaining six are shown in Figure 8. For all questionnaire items, users of Bosch Connect exhibited higher agreement.

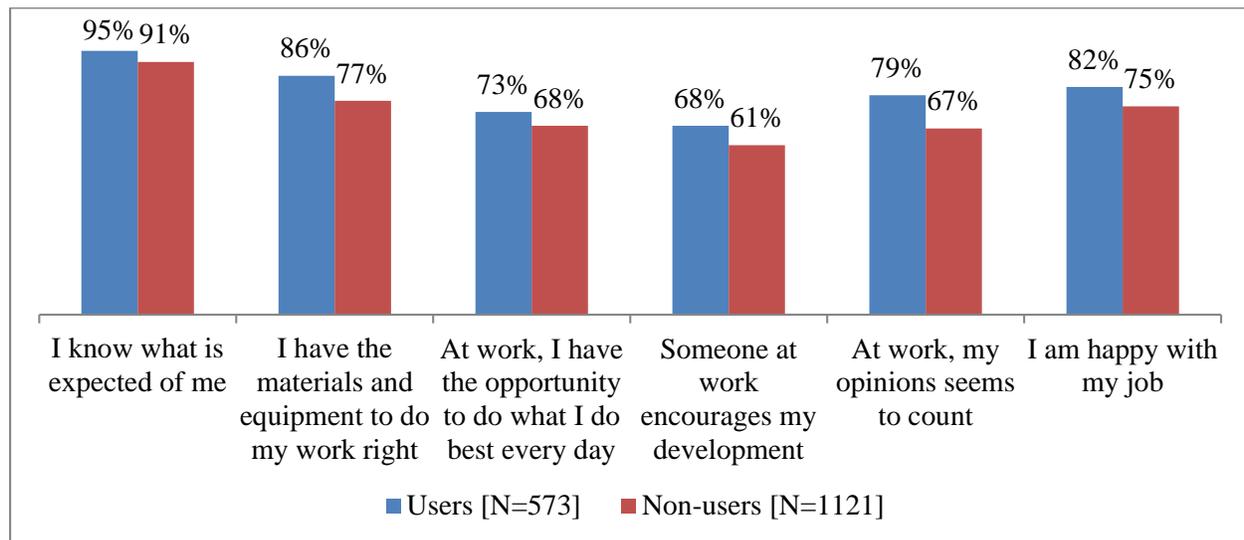


Figure 8. Responses to six questions forming the employee engagement construct

### Results of competence ratings

Users and non-users of Bosch Connect reported their ratings of four competencies as shown in Figure 9. The two different groups rated themselves differently on the four competencies. These figures indicate the percentage of those who rated themselves as higher or much higher than their peers on the four competencies. The smallest difference between the two groups was about leadership with 63% for users and 60% for non-users. The highest gap was between 80% for users and 66% for non-users, regarding readiness for change/adaptability. An 8% difference was noted between the reported rating on the entrepreneurial mindset competency, for which the users of Bosch Connect reported 58% and the non-users reported 50%. Finally, 65% of Bosch Connect users rated themselves higher or much higher than their peers on the communication competency in contrast to 56% for the non-users.

## Internal Social Media Usage

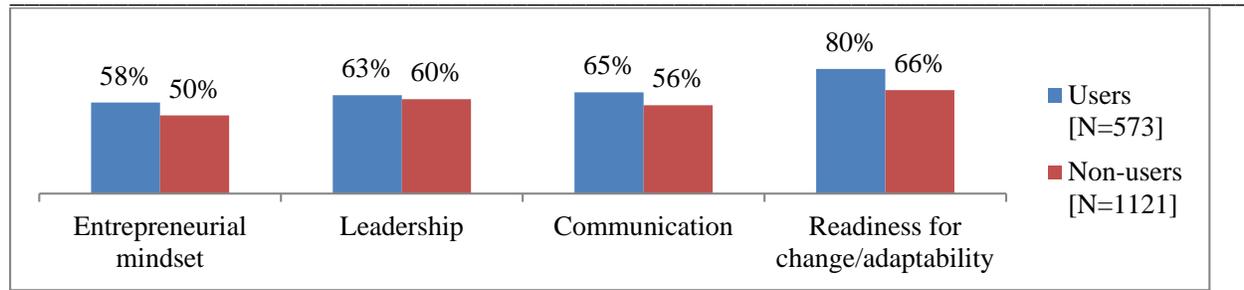


Figure 9. Responses to the four questions forming the self-reported competency construct

### Inferential analysis - Structural equation modeling

Structural equation modeling (SEM) is a statistical method that can be employed to test causal relationships between constructs built upon measurable variables (Anderson and Gerbing, 1982). SEM is comprised of both observed variables, which are called manifest or measured variables (MVs), and unobserved variables, which are called underlying or latent variables (LVs). The variables can be arranged graphically in a SEM path model. In a SEM path model, LVs are typically represented by multiple MVs that serve as indicators of the underlying constructs. The MVs can be independent (exogenous) in nature whereas LVs can be either independent (exogenous) or dependent (endogenous) in nature (Shah and Goldstein, 2006). The SEM path model is an a priori hypothesis about a pattern of linear relationships among a set of observed and unobserved variables (Henseler, Ringle and Sinkovics, 2009).

A variance-based partial least square (PLS)-SEM technique was used in this study. PLS-SEM path models include two types of linear equations: the inner model and the outer model. The inner model specifies the relationships between LVs, whereas the outer model specifies the relationships between a LV and its MVs. Furthermore, the PLS-SEM technique can be used for any type of distribution regardless of the sample size (Green and Ryan, 1990; Johansson and Yip, 1994). The individual path coefficients of the SEM-PLS structural path model can be interpreted in terms of standardized coefficients ( $\beta$ ) of ordinary least squares regressions. Parameter estimates are obtained based on the ability to minimize the residual variances of dependent variables (Henseler et al., 2009). Confidence intervals can be drawn on the  $\beta$  coefficients by calculating the Student's  $t$  statistic using a re-sampling non-parametric algorithm called bootstrapping (Henseler et al., 2009). The PLS-SEM method was employed to analyze the effect of Bosch Connect usage on self-reported employee competence and engagement.

### Results of hypothesis testing

To obtain a better understanding of the aggregate treatment of the hypothesis testing provided in the PLS procedure, correlations were calculated for each of the individual relationships between items as well. Hypothesis 1 was concerned with the relationship between self-reported Bosch Connect usage and employee engagement. The results of a Spearman correlation between each of the Employee Engagement items and the frequency of Bosch Connect usage can be found in Table 3. All but one of the engagement items were significantly correlated with the frequency of use of Bosch Connect. It should be noted that the coefficients are negative based on the way the frequency responses were coded (the higher frequency of use had a lower value). "Am happy with my work" did not achieve the .05 threshold but it was very close at .075. Hypothesis 1 was rejected based on the aggregate results of the correlation analyses.

Hypothesis 2 was tested similarly to the first hypothesis. A Spearman correlation coefficient was calculated for each of the four companywide competencies. All four competencies were significantly related to the self-reported usage of Bosch Connect; therefore Hypothesis 2 was rejected as well.

The results of the tests for Hypothesis 3 were a bit more complicated. The shaded area within the Table 5 matrix represents significant relationships. The results appeared to validate expected relationships. "I know what is

## Internal Social Media Usage

expected of me” and “My opinions seem to count...” were correlated with self-reported performance on each of the competencies. Based on the results of the data analysis, “Someone encourages my development...” and “Vision and mission updated with employee input” were not correlated with any of the self-reported competencies. Several other employee engagement items were related to at least some of the self-reported performance regarding each of the four company-wide competencies. Of the items representing the employee engagement construct, the employee satisfaction item (“Am happy with my work”) was related only to one competency: “Perceived readiness for change.” This seems consistent with today’s rapidly changing work environments.

**Table 3. Correlation between Bosch Connect usage and Employee Engagement items**

		I know what is expected of me	I have the materials and equipment needed	I have the opportunity to do best everyday	Someone encourages my development at Work.	My opinions seem to count at work	Vision and mission make my work Important	Vision and mission updated with employees input	Success factors for North America guide my efforts and improve	Am happy with my work
How Often use Bosch Connect	Correlation Coefficient	-.070**	-.147**	-.044	-.085**	-.127**	-.079**	-.058*	-.058*	-.044
	Sig. (2-tailed)	.004	.000	.072	.000	.000	.001	.017	.017	.075
	N	1684	1677	1676	1679	1679	1682	1677	1672	1669

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

**Table 4. Correlation between Bosch Connect frequency of use and the self-reported four competencies**

		Entrepreneurial	Leadership	Communication	Readiness for Change
Frequency of Use of Bosch Connect	Correlation Coefficient	-.102**	-.046	-.101**	-.166**
	Sig. (2-tailed)	.000	.060	.000	.000
	N	1694	1694	1694	1694

## Internal Social Media Usage

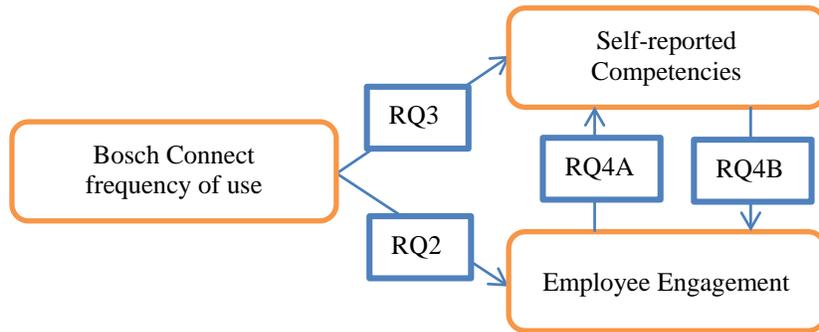
**Table 5. Correlation between the self-reported competencies and Employee Engagement**

		I know what is expected of me	I have the materials and equipment needed	I have the opportunity to do best everyday	Someone encourages my development at Work.	My opinions seem to count at work	Vision and mission make my work Important	Vision and mission updated with employees input	Success factors for North America guide my efforts and improve	Am happy with my work
Entrepreneurial	Correlation Coefficient	.137**	.021	.010	-.005	.051*	.050*	-.013	.030	.004
	Sig. (2-tailed)	.000	.399	.688	.854	.037	.040	.608	.224	.867
	N	1684	1677	1676	1679	1679	1682	1677	1672	1669
Leadership	Correlation Coefficient	.141**	.064**	.056*	.017	.117**	.042	.041	.053*	.018
	Sig. (2-tailed)	.000	.009	.022	.487	.000	.083	.094	.030	.461
	N	1684	1677	1676	1679	1679	1682	1677	1672	1669
Communication	Correlation Coefficient	.147**	.082**	.078**	.029	.049*	.030	.001	.024	.031
	Sig. (2-tailed)	.000	.001	.001	.241	.043	.223	.965	.321	.200
	N	1684	1677	1676	1679	1679	1682	1677	1672	1669
Readiness for Change	Correlation Coefficient	.134**	.057*	.077**	.043	.070**	.063**	.013	.038	.093**
	Sig. (2-tailed)	.000	.020	.002	.081	.004	.010	.607	.124	.000
	N	1684	1677	1676	1679	1679	1682	1677	1672	1669

The PLS-SEM path model for this study had four paths (see Figure 10 below):

- 1) Bosch Connect Frequency of Use → Self-Reported Competencies
- 2) Bosch Connect Frequency of Use → Employee Engagement
- 3) Employee Engagement → Self-Reported Competencies
- 4) Self-Reported Competencies → Employee Engagement

## Internal Social Media Usage



**Figure 10. PLS-SEM four paths model for the study**

The findings below address the research questions *RQ2: How does the level of Bosch Connect usage impact the level of employee engagement?*, *RQ3: What is the impact of Bosch Connect usage on a number of self-reported competencies?*, and *RQ4: What is the relationship between the level of employee engagement and self-reported competencies?* See Figure 10 and Tables 6 and 7.

Table 6 addresses RQ2 and RQ3. In this table, all the  $\beta$  values were positive on the PLS-SEM path model. The path for RQ2 had a  $\beta$  value of 0.205; the path for RQ3 was 0.209. Table 7 addresses RQ4. In this table, both paths for RQ4 had the same  $\beta$  value for both directions, 0.197. For data samples with approximately 1600 degrees of freedom, statistical significance was demonstrated for a two sided 95% confidence interval if the Student's *t* values were equal to or greater than 1.96. A 99% confidence interval statistical significance was demonstrated by Student's *t* values equal to or greater than 2.58. The degrees of freedom associated with the threshold values were calculated from the number of data points. The paths for RQ4 (RQ4A and RQ4B) were not found to be statistically significant. The paths for RQ2 and RQ3 were both found to be statistically significant.

Based on these findings, Hypothesis 1 (which addresses RQ2): *There is no significant relationship between the frequency of Bosch Connect usage and the level of employee engagement based on the perceptions of employees*, and Hypothesis 2 (which addresses RQ3): *There is no significant relationship between the frequency of Bosch Connect usage and the level of self-reported competencies measured by the organization annually*, were rejected. In contrast, Hypothesis 3 (which addresses RQ4): *There is no significant relationship between employees' self-reported competencies and employees' engagement levels*, was accepted. These findings provide preliminary evidence that usage of Bosch Connect has a causal positive relationship on both employee competencies and engagement. However, the effect of competencies and engagement could not be substantiated. One plausible explanation is that employee self-reported engagement is not dependent on her/his self-reported competence. Additional studies will be needed to explore this relationship.

## Internal Social Media Usage

**Table 6. PLS-SEM analysis results (1)**

PLS-SEM Path	$\beta$	Student's t-value	Bootstrapping Samples	Student's t-value threshold 95% confidence interval (2 tailed)	Student's t-value threshold 99% confidence interval (2 tailed)	Statistically Significant
RQ3: Bosch Connect Frequency of Use $\rightarrow$ Self-Reported Competence	0.209	2.350	100	1.96	2.58	Yes
		3.828	300			Yes
		5.194	500			Yes
		7.076	1000			Yes
RQ2: Bosch Connect Frequency of Use $\rightarrow$ Employee Engagement	0.205	2.811	100			Yes
		4.339	300			Yes
		5.210	500			Yes
		7.191	1000			Yes

**Table 7. PLS-SEM analysis results (2)**

PLS-SEM Path	$\beta$	Student's t-value	Bootstrapping Samples	Student's t-value threshold 95% confidence interval (2 tailed)	Student's t-value threshold 99% confidence interval (2 tailed)	Statistically Significant
RQ4A: Employee Engagement $\rightarrow$ Self-Reported Competencies	0.197	0.864	500	1.96	2.58	No
RQ4B: Self-Reported Competencies $\rightarrow$ Employee Engagement	0.197	0.916	500			No

## CONCLUSIONS, IMPACT, AND FUTURE RESEARCH

### Conclusions

A number of conclusions can be drawn from this research endeavor. Each research question is addressed below.

*RQ1: What is the extent of use of Bosch Connect and what apps are receiving the most use?* Slightly more than one-third of the employees reported using internal social media. Of the specific apps used, Wikis, Forums, Profiles and Communities were used by more than 80% of the users.

*RQ2: How does the level of Bosch Connect usage impact the level of employee engagement?* The greater the self-reported usage of internal social media, the greater the levels of self-reported employee engagement. Of the

## Internal Social Media Usage

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nine employee engagement items, seven were significantly correlated to usage while the remaining two were very close to being significant with p values of approximately .07.

*RQ3: What is the impact of Bosch Connect usage on a number of self-reported competencies?* Those employees who reported using internal social media rated themselves higher on each of the four company-wide competencies. The leadership competency was not significantly related to the frequency of use of internal social media. Instead, the entrepreneurship, communication, and readiness for change self-reported competencies were correlated to internal social media usage.

*RQ4: What is the relationship between the level of employee engagement and self-reported competencies?* When attempting to address this research question, the results were mixed. The engagement items that addressed “I know what is expected of me” and “my opinion seems to count at work” were highly correlated to each of the four competencies. Contrarily, “someone encourages my development at work” and “vision and mission updated with employee input” were not correlated to any of the four competencies. The remaining five engagement items were each correlated to between one and three competencies.

Finally, a PLS-SEM procedure explored causality among the three constructs (frequency of use, level of engagement, and level of competence). The results provide preliminary evidence that the use of internal social media may cause an increase in employee engagement and of higher self-ratings on the four competencies. No evidence for causality was found between engagement and competence based on the results of this study.

### Study impact

As a result of this study it was recommended that Robert Bosch NA encourage employees to use Bosch Connect to contribute, listen and share information; design and deliver a Bosch Connect training program for all employees; and examine divisions with low Bosch Connect usage to determine what barriers exist in those units. Additionally, the company was encouraged to use the results of the study to re-examine the features/apps to determine which could be eliminated or modified using the Plan-Do-Check-Act cycle. Modifying the biannual employee survey to include key items from the instrument used for this research would enable the company to track performance. Within the region of North America, Bosch has plans to measure employee engagement annually and track the usage of features/apps within the platform based on this study and other initiatives.

Based on the findings, companies designing or modifying an internal social media platform should consider introducing training programs to ensure that the capabilities and operational procedures are known by all. Once the program is implemented, media usage could be tracked by unit to determine how often and for how long a particular app is used by each employee. Companies with fully implemented internal social media platforms could formally integrate the platform into their efforts to promote innovation in both products and processes. Given the association observed in this study between usage and engagement and competencies, it may be helpful for companies to track internal social media usage, employee engagement, and perceived competencies regularly.

### Suggested future research

Future studies should focus on actual usage rather than reported usage. Internal social media tracking can be used to determine how often and for how long a particular app/tool is used by an employee but some provisions must be made to ensure that the rights of the individual are not violated. Evidence of employee engagement such as the number of sick days used, individual performance ratings, and the number of suggestions for improvement provided by the employee, when coupled with self-reported engagement, would improve the validity of the measurement of this construct. Quasi-experimental efforts to determine the impacts of internal social media usage on employee engagement and other constructs are encouraged to validate the SEM findings in this study.

Companies should consider identifying ways to encourage more use of internal social media platforms and exploring how effectively the posted information should be managed. To promote adoption, future research may explore more business activities that can be supported within (or within extensions of) internal social media platforms. More research is also needed to explore better ways to govern activities within these platforms. For example, better support for user needs such as privacy management, security, and dispute resolutions would be beneficial. Finally,

## Internal Social Media Usage

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future research is needed to fully validate the preliminary evidence presented in this article by conducting similar studies in different sectors and geographical areas.

## ACKNOWLEDGEMENTS

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## Internal Social Media Usage

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