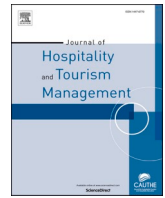




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# Role of mobile application attributes in building job meaningfulness among food delivery employees

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## ABSTRACT

In the era of COVID-19 and beyond, with increasing demand for food delivery services, the food delivery industry has experienced tremendous growth in countries worldwide. Despite the proliferation of mobile technologies in the workplace, little is known about the contextual factors that contribute to its impact on employees' behavior. Thus, this study aims to understand the psychological mechanisms that explain the relationship between mobile application-related attributes and job-related outcomes for employees. Drawing on self-determination theory, the authors examine whether needs satisfaction in employees regarding company mobile applications acts as a determinant of motivation in employees, which can influence job meaningfulness. Participants were 208 food service delivery employees in the United States. Results of partial least squares-structural equation analysis show 1) the relative impact of needs satisfaction (i.e., autonomy, competence, and relatedness) on employees' intrinsic and extrinsic motivations and 2) the spill-over effect of employees' motivation on their job meaningfulness. These results indicate that autonomy, competence, and connected attributes of mobile applications can benefit employees. Thus, this study provides a basis for a deeper understanding of how food service companies can design mobile applications to increase employees' motivation.

## 1. Introduction

In the era of COVID-19 and beyond, consumer demand for food delivery services has experienced significant growth. Due to risks associated with dining in at restaurants (e.g., face-to-face service, contact with other customers, indoor viral spread), a growing number of customers use online food delivery services. According to Statista.com (2021), the online food delivery sector revenue was expected to reach US\$270,317M, and the market size of delivery platforms was quantified at US \$148,358M in 2021. Globally, the food delivery sector is worth more than \$150 billion (Mckinsey.com, 2021). Also, the development of communication and transportation technologies has allowed an increasing number of customers to use food delivery services (Song, Ruan, & Jeon, 2021). Consistent with this trend, the number of US food delivery employees has increased to over 1,305,000 (Zipppia.com, 2021).

Employee behavior is associated with various aspects of their jobs, including physical, psychological, social, and organizational features that influence job performance and employee well-being (Ashkanasy, Ayoko, & Jehn, 2014; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). Work resources influence employees' goal achievement and

personal development (Albrecht, Bredahl, & Marty, 2018; Hameed & Waheed, 2011; Wiklund & Shepherd, 2003). For instance, studies have identified the importance of work characteristics (e.g., team cohesion, job autonomy) for increasing employee work performance, decreasing negative emotions (Ogbonnaya & Messersmith, 2019), and ensuring well-being (Kooij et al., 2013). Recently, many companies have adopted new technologies to enhance employee performance (Lee, 2017).

Given the importance of understanding employee behavior, studies have identified determinants of employee behavior. For instance, some studies suggested that motivation, leadership, and organizational culture are involved in employee satisfaction (Paais & Pattiruhu, 2020). In addition, the work of Mohiuddin Babu (2018) found that companies' customer orientation is related to employee commitment and performance. An explanation for these findings is that job-related resources can influence both employees' job performance and individual accomplishments. Self-determination theory (Deci & Ryan, 1985) supports this because work environments can facilitate employee satisfaction levels by meeting their psychological needs, which are determinants of their eudaimonic well-being (Gagné & Deci, 2005).

The self-determination model provides a useful framework to

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understand the relationship between satisfaction of basic needs in individuals and their life satisfaction. The research to date, however, has not fully addressed the role of psychological mechanisms in explaining how job-related resources predict job meaningfulness as perceived by employees. Furthermore, despite the growth of the online food delivery industry, most research has focused on understanding customers' experiences with mobile applications (Cha & Seo, 2020). Given the increasing importance of understanding employees' job-related mechanisms, this study examines employee experiences with mobile applications in the food delivery context. Specifically, based on SDT, this study examines the relationships between needs satisfaction in employees (i.e., needs for autonomy, competence, and relatedness) regarding job resources (i.e., mobile applications), motivation levels (i.e., intrinsic and extrinsic), and perceived job meaningfulness. Notwithstanding these notable implications and extensive discussion of employees' motivation in management research (Mitchell, Schuster, & Jin, 2020), empirical studies examining the relative role of employees' needs satisfaction dimensions remain scarce in the hospitality and tourism context. Thus, this research improves understanding of the mechanisms underpinning basic needs satisfaction on employee motivation and potential positive effects of employees' job satisfaction.

### 1.1. Theoretical framework

Self-determination theory (SDT) has been widely applied to understand the behavior of employees across jobs (Deci & Ryan, 1985; Ryan & Deci, 2017). According to SDT, both employees' performance and welfare are affected by levels of motivation to work (Deci & Ryan, 1985; Ryan & Deci, 2017). SDT categorizes two types of motivation: intrinsic and extrinsic (Lonsdale & Hodge, 2011); functionally speaking, different types of motivation have different catalysts, combinations, and results. Intrinsic motivation describes a person's pursuit of activities for their own enjoyment and interest, whereas extrinsic motivation refers to a person's pursuit of activities for reasons bringing recognition or tangible or intangible rewards (Meyer & Gagne, 2008). Research has discussed the different roles of intrinsic and extrinsic motivation in employee performance. Quite often, for instance, the result of employees' having intrinsic motivation is high-quality work performance and good health (Ryan & Deci, 2017). In contrast, extrinsic motivation includes all instrumental actions, whether tangible or otherwise. SDT has long divided extrinsic motivation into different formats, each of which is identifiable in the workplace (Ryan & Connell, 1989).

SDT suggests that optimized functional and psychological control can be achieved when universal psychological needs are assembled (Deci & Ryan, 1985; Ryan & Deci, 2017). In particular, the satisfaction of needs for autonomy, competence, and relevance is a prerequisite for happiness. Employees develop an awareness of the patterns of demands during their workdays, and understanding this experience leads to the satisfaction of employees' needs for autonomy. In various processes, employees recognize their work patterns on an ongoing basis, thus completing a form of self-assessment and raising their understanding of the potential value of their work and lives. These experiences, in turn, assist in satisfying employees' needs for competence. In addition, employees have a constant need to connect with others (customers and commercial segments) in the context of service delivery, which when achieved fosters positive and sustainable relationships that will satisfy the need for relatedness (Slemp & Vella-Brodrick, 2014). Accordingly, the characteristics of work environments are related to employees' levels of self-satisfaction. Satisfaction levels, high or low, are individuals' psychological responses to their work, whereas motivation is closely related to employees' needs for autonomy, competence, and relatedness.

## 2. Literature review

### 2.1. Concept of digital transformation

Many scholars have examined the concept of digital transformation, including digital transformation (Broekhuizen, Broekhuis, Gijsenberg, & Wieringa, 2021), digital technologies (Correani, De Massis, Frattini, Messeni Petruzzelli, & Natalicchio, 2020), and digital innovation (D'Ippolito, Petruzzelli, & Panniello, 2019). Researchers suggested that digital transformation is complex because it is a multifaceted (Vial, 2019), multidimensional phenomenon (Zangiacomi, Pessot, Fornasiero, Bertetti, & Sacco, 2020) affecting organizations at different levels and in different forms. Digital transformation has been widely adopted to examine the technologies such as AI, the industrial internet of things, big data, and smart products (Berger, von Briel, Davidsson, & Kuckertz, 2021; Farrington & Alizadeh, 2017; Fossen & Sorgner, 2021; Mariani & Fosso Wamba, 2020; Raff, Wentzel, & Obwegeser, 2020; Verganti, Vendraminelli, & Iansiti, 2020). The research showed how digital transformation describes the deep-seated changes occurring at multiple levels and shaping the ways agents innovate by sensing, seizing, and transforming opportunities engendered by the new digital paradigm (Appio, Frattini, Messeni Petruzzelli, & Neirotti, 2021). The research has profound and wide-ranging effects on competitive dynamics, business models, value chains, and required competencies of manufacturing and service firms (e.g., Iansiti & Lakhani, 2014; Raff et al., 2020; Svahn, Mathiassen, & Lindgren, 2017). Due to the rapid growth of digital technologies and the extraordinary amount of data that devices and applications collect each day, many companies radically transform the business architecture through which they create and appropriate value (Correani et al., 2020). Also in the service industry, service providers have experienced digital transformation and applied digital technology. With the development of the food delivery, many companies have used mobile applications in food delivery work projects. Thus, the authors examined employees' experience with mobile application in the food delivery context.

### 2.2. Antecedents of employee intrinsic motivation

SDT shows that social environments influence intrinsic motivation through perceptions of autonomy (Grouzet, Vallerand, Thill, & Provencher, 2004). In the food delivery context, workers can act more comfortably through mobile applications (apps), many of which have become popular during COVID-19. Indeed, certain job resources help individual employees meet their basic need for autonomy in their work. For instance, food delivery providers have increased work efficiency via the use of mobile apps that allow greater convenience and agency among food deliverers. Ongoing achievement of a broader range of skills and knowledge is important for their work, and with mobile apps, the food delivery industry is attempting and mastering new tasks, thereby incorporating more into their core work roles (e.g., Morgeson & Campion, 2002). This autonomy strengthens employees' motivation to recognize them. Using mobile applications, food delivery employees can look after the orders for which they are responsible, checking on timing and circumstances at any point. They can also reduce uncertainty and feel instant satisfaction and accomplishment in completing any single task. This level of control will increase employees' intrinsic motivation to work. Therefore, the following hypothesis is proposed.

**H1.** Satisfaction of the need for autonomy is an antecedent of employees' intrinsic motivation.

The need for competence is defined as an individual's desire to feel valuable in their interactions with their environment (Deci & Ryan, 2000). The need for competence is one of the three basic psychological needs for individuals. When employees feel competence, they are more likely to overcome obstacles and exceed the criteria of their tasks. Competence satisfaction allows individuals to work in complex and

multilateral work environments (Deci & Ryan, 2000). Mobile applications enable food delivery providers to work in a state of ease and greater efficiency to achieve their work objectives. Mobile applications allow more direct and effective experiences because employees feel capable of dealing with work situations. When certain goals are achieved, employees experience confidence and other positive emotions, further enhancing their sense of accomplishment (Winterbottom, 1958). Positive feedback and effective long-term accumulation through mobile applications will be necessary in the future to successfully complete specific tasks. Therefore, the following hypothesis is proposed.

**H2.** Satisfaction of the need for competence is an antecedent of employees' intrinsic motivation.

Relatedness refers to feelings of connection with others (Baumeister & Leary, 1995). In the food delivery industry, employees have opportunities to connect with customers, people on the business side, and delivery workers. As suggested in SDT, intrinsic motivation is more likely to flourish in environments characterized by a sense of relevance (e.g., Ryan & Deci, 2000). Food delivery providers can increase connections for food delivery workers via mobile applications. Business interdependence helps meet the need for relevance (Kuvaas, 2009). Bachrach, Powell, Bendoly, and Richey (2006) found that meeting the need for relatedness is associated with norms for communication, information sharing, expectations, and cooperation. Voluntary interchange, cooperation, and coordination of the parties are involved in the activities of interdependence and interdependence (Podsakoff, MacKenzie, Paine, & Bachrach, 2000). Most individuals are naturally motivated to work in environments of interdependence and open communication; as employees' needs for relatedness are increasingly met, intrinsic motivation increases. Therefore, the following hypothesis is proposed.

**H3.** Satisfaction of the need for relatedness is an antecedent of employees' intrinsic motivation.

### 2.3. Antecedents of employees' extrinsic motivation

Intrinsic motivation is based on expected positive results, such as improved performance, remuneration, and promotion (Deci, 1972; Lawler & Porter, 1967). Extrinsic motivation is also a factor that influences a person's behavior, such as the desire for reward or recognition (Yoo, Han, & Huang, 2012). Extrinsic incentives include anything related to work, such as promised rewards, commendations, and deadlines (Amabile, 1993). Individuals often experience different psychological processes and reactions depending on such circumstances. Employees are likely to focus on meeting extrinsic demands or maintaining their egos and tend to exhibit motivational profiles dominated by extrinsic rather than intrinsic motivation (Graves, Cullen, Lester, Ruderman, & Gentry, 2015). For instance, with increased wages, a food delivery employee might be willing to work harder. Many extrinsic factors increase employee motivation and ultimately have a positive impact on worker productivity (Emeka, Amaka, & Ejim, 2015). In the delivery industry, workers are paid for completing orders. The higher the number of orders completed in a given period of time, the greater is the remuneration received. Therefore, if a mobile application is used for an order transaction, then deliveries can be completed with greater ease and flexibility. Delivery workers will not only be able to finish more orders in a limited time but also have greater flexibility and autonomy in completion of order transactions. Therefore, the following hypothesis is proposed.

**H4.** Satisfaction of the need for autonomy is an antecedent of employees' extrinsic motivation.

Extrinsic motivation (motivation for the sake of reward or performance) is the most direct expression of an individual's competence. Extrinsic motivation manifests in satisfying external needs or defending

oneself (Graves et al., 2015). Formalities of extrinsic motivation are regulated by identification (Ryan & Deci, 2000). For example, wages and benefits have a positive impact on employee behavior and work behavior. Many studies have addressed the importance of wages in attracting and motivating outstanding employees (Alam, Hassan, Bowyer, & Reaz, 2020). In the mobile application context, employees can leverage their abilities to achieve higher goals related to individual performance. Work efficiency improves, providing the most direct feedback about employees' levels of competence. This link to extrinsic motivation allows employees to recognize their competence and role in the workplace. Therefore, the following hypothesis is proposed.

**H5.** Satisfaction of the need for competence is an antecedent of employees' extrinsic motivation.

SDT suggests that, in addition to perceived autonomy and competence, one's perceived relatedness is also centrally important in understanding the internalization of extrinsic motivation (Ryan & Deci, 2000). Satisfaction of employees' needs for relatedness is positively associated with external motivations in certain areas, such as health (Gourlan, Trouilloud, & Sarrazin, 2013). When people develop a strong sense of connection with others, their need for relatedness is likely to be satisfied (Wang & Li, 2016). For food delivery people, mobile applications are essential tools. Over time, mobile applications have proliferated among food delivery providers, and employees have more fully incorporated their brands due to long-term use of mobile apps. In this way, mobile applications have greatly increased relatedness for food delivery employees. Mobile applications also allow food delivery providers to process orders at any time, to quickly meet consumer needs, and to establish direct connections. In addition, due to the nature of remuneration for delivery workers, employees can check their income at any point in their shift via mobile applications. This study asserts that mobile applications not only improve delivery workers' relatedness but also demonstrate social development and improve communication and understanding among delivery people, merchants, and customers. Therefore, the following hypothesis is proposed.

**H6.** Satisfaction of the need for relatedness is an antecedent of employees' extrinsic motivation.

### 2.4. Consequences of intrinsic and extrinsic motivation: job meaningfulness

Individual behavior is the most important outcome of motivation, and intrinsic motivation is of the highest order (Meyer, Becker, & Vandenberghe, 2004) because it is an expression of a high energy level and durability and is associated with personal enthusiasm and participation (Van den Broeck, Lens, De Witte, & Van Coillie, 2013). There are positive correlations between intrinsic motivation and happiness, work performance, and creativity (Gagné & Deci, 2005). In addition to performance enhancement, intrinsic motivation can stimulate a wide range of behaviors and emotions, mainly reflecting autonomous and influential experiences (Cho & Perry, 2012; Deci & Ryan, 1985; Lemyre, Treasure, & Roberts, 2006). Extrinsic motivation can also have a positive impact on job performance (Kuvaas, Buch, Weibel, Dysvik, & Nerstad, 2017). A contingency involving a particular action and an expected outcome, such as a tangible incentive (Gagné & Deci, 2005), is possible. If external motivation is key to the correlation between motivation and performance, then external motivation can improve performance (Kuvaas, 2017). Work performance and employee well-being are positively predicted by both intrinsic and extrinsic motivation through synergy in performance (Porter & Lawler, 1968; Stajkovic & Luthans, 2003). Therefore, the following hypotheses are proposed.

**H7.** Intrinsic motivation has positive effects on meaningfulness in employees' work.

**H8.** Extrinsic motivation has positive effects on meaningfulness in

employees' work.

Fig. 1 depicts the proposed model including employees' needs satisfaction, levels of motivation, and job meaningfulness in the context of food delivery services.

### 3. Methods

#### 3.1. Data collection

An online self-administered survey was conducted with employees working in the food delivery industry and using mobile application for their work. Given the growth of food delivery industry and number of food delivery employees in the United States after COVID-19 (Zippia.com, 2021), this study focused on US food delivery employees' behavior. The survey was constructed using Qualtrics and distributed using an online crowdsourced recruitment platform, Amazon Mechanical Turk. Amazon Mechanical Turk was used as its samples are largely equivalent to the traditional recruitment strategies (Casler, Bickel, & Hackett, 2013). Worker criteria (e.g., employment industry-food & beverage) and several screening questions (e.g., Are you currently working as the food delivery employee?) were used. Also, respondents were asked to answer questions such as the delivery platform they had most recently worked for, and this answer was embedded the work-related questions. Two hundred eight food delivery employees participated in this survey. Of total respondents, 67% were male, and 33% were female. Also, 47% of respondents were from 18 to 29 years of age, while 32% were 30–39. The majority of participants were college graduates (80%). The average duration of employment in food delivery services was 13 months. Sample characteristics are shown in Table 1.

#### 3.2. Data analysis and results

All measures were assessed with various items adopted from previous studies using a seven-point Likert scale. The proposed model was analyzed using partial least squares-structural equation modeling with SmartPLS. First, the authors examined the validity and reliability of the measurement model. Factor loadings for all constructs were greater than 0.80, and average variance extracted (AVE) values were between 0.67 and 0.81, suggesting convergent validity. Cronbach's alpha values ranged from 0.72 to 0.90, indicating sufficient reliability. Composite reliability scores were also acceptable, as shown in Table 2. Additionally, the AVE value of each factor was greater than the square of the correlation between the examined factor and the rest of the factors, indicating discriminant validity (Table 3). The R<sup>2</sup> values of the

**Table 1**  
Demographic profile of respondents.

Variable	N	(%)
<i>Gender</i>		
Male	139	67%
Female	69	33%
<i>Age</i>		
18–29 years of age	98	47%
30–39 years of age	67	32%
40–49 years of age	28	13%
Older than 50	15	7%
<i>Education level</i>		
High school	6	3%
Some college/technical training	12	6%
College graduate	166	80%
Postgraduate school	24	12%
<i>Income</i>		
Under \$39,999	37	18%
\$40,000–\$69,999	98	47%
\$70,000–\$99,999	58	28%
\$100,000 and over	15	7%

dependent variables ranged from 0.52 to 0.63. As suggested by Chin (1998), R<sup>2</sup> values of 0.67, 0.33, and 0.19 can be designated as substantial, moderate, and weak, respectively, indicating that the proposed model is moderate.

Hypotheses H1-3 suggest that employees' needs satisfaction with mobile applications influence aspects of intrinsic motivation. As shown in Table 4, autonomy ( $\beta = 0.38, t = 4.97, p < 0.01$ ), competence ( $\beta = 0.27, t = 3.08, p < 0.01$ ), and relatedness ( $\beta = 0.23, t = 2.79, p < 0.05$ ) have significant effects on intrinsic motivation. Thus, H1, H2, and H3 are supported. Hypotheses H4-6 state that needs satisfaction directly influences extrinsic motivation for employees. The results show that the satisfaction of employees' needs for autonomy ( $\beta = 0.32, t = 4.20, p < 0.01$ ), competence ( $\beta = 0.17, t = 2.17, p < 0.05$ ), and relatedness ( $\beta = 0.32, t = 3.92, p < 0.01$ ) from mobile applications has significant effects on extrinsic motivation, supporting H4-H6. Finally, in this study, the impacts of intrinsic ( $\beta = 0.51, t = 5.38, p < 0.01$ ) and extrinsic ( $\beta = 0.33, t = 3.66, p < 0.01$ ) motivation on employees' job meaningfulness are demonstrated. Accordingly, H7 and H8 are supported.

### 4. Discussion and conclusion

Due to rapid growth in the food delivery industry, understanding employee motivation in food delivery environments is important for employee development according to the tenets of the SDT. This study

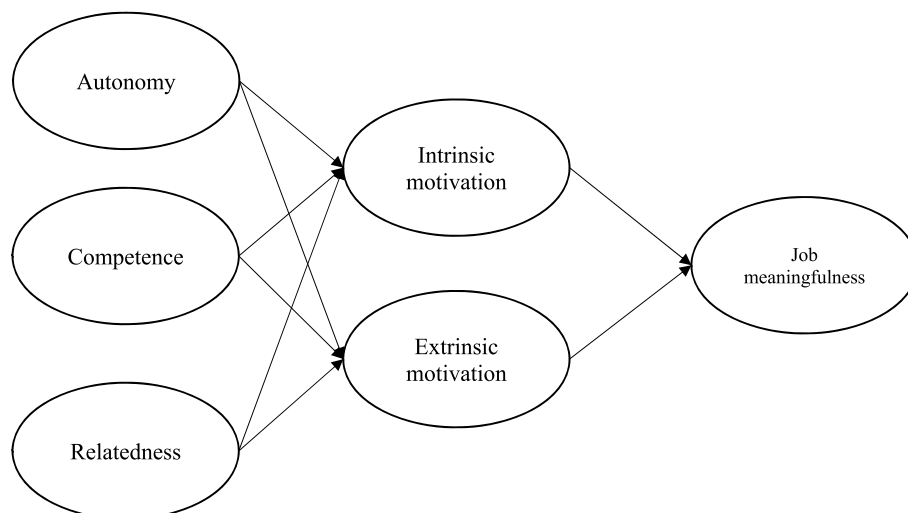


Fig. 1. Proposed model.

**Table 2**  
Cronbach's alpha and standardized regression weight scores for variables.

Variable	FL	$\alpha$	CR	AVE
<i>Autonomy</i>				
Using my company's mobile application makes me feel free to do things my way.	0.89			
Using my company's mobile application makes me feel free to be who I am.	0.91	0.90	0.89	0.81
<i>Competence</i>				
Using my company's mobile application makes me feel capable.	0.90	0.77	0.90	0.81
Using my company's mobile application makes me feel effective.	0.91			
<i>Relatedness</i>				
I feel a lot of brand closeness when I use my company's mobile application.	0.88	0.72	0.89	0.80
Using my company's mobile application makes me feel very close to this brand.	0.90			
<i>Intrinsic motivation</i>				
Becoming successful in delivery industry is something that I want to do for me.	0.92	0.77	0.90	0.81
If I were independently wealthy, I would still work in delivery industry for the challenge of it.	0.89			
<i>Extrinsic motivation</i>				
If it weren't for the money, I would not be in a delivery industry.	0.81	0.75	0.86	0.67
I work in delivery industry because I get paid to sell.	0.84			
After a long hard day, I realize that if it weren't for the money, I wouldn't put up with this job.	0.80			
<i>Job meaningfulness</i>				
My job allows me to have control over my life.	0.92	0.79	0.91	0.83
My job allows me to grow and develop as a person.	0.90			

Note: FL = factor loading,  $\alpha$  = Cronbach's alpha, AVE = average variance extracted.

focused on the impact of work motivation (intrinsic and extrinsic) on job meaningfulness in food delivery workers. Based on SDT, this study found that perceived autonomy, competence, and relatedness satisfaction in food delivery employees are important determinants of job meaningfulness for employees by increasing both intrinsic and extrinsic motivation. The findings of this study provide useful guidelines for both practitioners and academia in the food service industry.

4.1. Theoretical implications

This study aimed to expand the current understanding of food delivery experience with mobile application and its outcomes. The theoretical implications are three-fold. First, the study shows that it is essential to apply SDT to reach a more comprehensive understanding of employees' motivation to use mobile applications. Although recent hospitality and tourism studies have applied SDT to understand the role of needs satisfaction, they focused on customers' satisfaction with basic needs (Ahn & Back, 2019). As service companies have increasingly implemented advanced mobile technologies, this study applied SDT to examine underlying motivations of employees' usage behavior. Similar to previous studies in SDT (Porter & Lawler, 1968, Stajkovic & Luthans, 2003, Sansone & Harackiewicz, 2000; Meyer & Gagne, 2008), food delivery employees' motivation to work can be explained with SDT. As SDT suggests (Deci & Ryan, 1985, 1987; Gagné & Deci, 2005; Ryan & Deci, 2000), our findings suggest that the basic needs of employees can

**Table 3**  
Descriptive statistics and correlations among the study variables.

Variable	Autonomy	Competence	Relatedness	Intrinsic motivation	Extrinsic motivation	Job meaningfulness
Autonomy	0.90					
Competence	0.73	0.90				
Relatedness	0.70	0.71	0.89			
Intrinsic motivation	0.75	0.72	0.69	0.90		
Extrinsic motivation	0.66	0.64	0.66	0.74	0.82	
Job meaningfulness	0.73	0.71	0.69	0.75	0.71	0.91

be satisfied through the use of mobile applications. In other words, for employees in the food delivery industry, mobile application experiences can directly and quickly resolve some industry-specific issues of delivery work and help satisfy the innate psychological needs for autonomy, competence, and relatedness.

Second, the study contradicts some SDT studies (Deci & Ryan, 2000; Seguin et al., 1998) by identifying the relative impact of multidimensional needs satisfaction on intrinsic and extrinsic motivations. In contrast to the previous studies examining employees' behavior without considering the multidimensional perspectives of needs satisfaction (Mitchell et al., 2020), the results of this study showed that employee-perceived autonomous characteristics of mobile application most significantly influences intrinsic motivation followed by competence and relatedness satisfaction. Also, the impact of relatedness satisfaction on extrinsic motivation was the greatest, followed by autonomy and competence satisfaction. Accordingly, increasing efficiency for delivery workers such as providing them with channels to increase personal earnings and maximizing capacity to work can energize their behavior that comes from an inherent interest in the activity. Increasing the ability of employees to work can influence their motivation to work for external rewards. This study suggested that mobile application-related characteristics can facilitate a different type of needs satisfaction.

Third, the study identified how employees' motivation may shape employees' well-being. In previous studies, researchers examined positive consequences of employees' extrinsic and intrinsic motivation such as positive behavioral intention (Mitchell et al., 2020). This study expands the previous knowledge by examining the consequences of motivation in employees' life evaluation. Specifically, employees using mobile applications increase their levels of satisfaction with basic needs in food delivery settings, which has a direct impact on job meaningfulness for the employees. In line with what academic studies that have suggested, extrinsic and intrinsic motivations are considered self-determined forms that may affect individual participation (Meyer & Gagne, 2008). The current study explored relationships among the antecedents of employees' needs satisfaction in terms of motivation (extrinsic and intrinsic) and perceived job meaningfulness in food delivery employees. The results confirm that encouraging the inclinations of employees to use mobile applications can spill-over to perceived job

**Table 4**  
Summary of results for the structural model.

Path	$\beta$	t	p
H1: Autonomy needs satisfaction → Intrinsic motivation	0.38	4.97	0.00
H2: Competence needs satisfaction → Intrinsic motivation	0.27	3.08	0.00
H3: Relatedness needs satisfaction → Intrinsic motivation	0.23	2.79	0.01
H4: Autonomy needs satisfaction → Extrinsic motivation	0.31	4.20	0.00
H5: Competence needs satisfaction → Extrinsic motivation	0.17	2.17	0.03
H6: Relatedness needs satisfaction → Extrinsic motivation	0.32	3.92	0.00
H7: Intrinsic motivation → Job meaningfulness	0.51	5.83	0.00
H8: Extrinsic motivation → Job meaningfulness	0.33	3.66	0.00
Total R <sup>2</sup>			
Intrinsic motivation		0.63	
Extrinsic motivation		0.52	
Job meaningfulness		0.61	

meaningfulness in food delivery.

#### 4.2. Practical implications

The results of this study provide guidance for workers and delivery application developers. First, the results of this study show a positive correlation between the satisfaction of individuals' basic psychological need for autonomy and the motivations that drive them toward autonomy. When people feel free due to the use of workplace resources such as mobile apps, they are more motivated to use apps, want to do more business, and want more practice using the apps. In terms of people's basic psychological need for autonomy, we know that individuals' motivation to use applications depends on the potential to meet this need. For autonomous detection to be implemented, mobile applications must contribute to employee performance achievement. In facilitating ease of use and technological expertise, application users are given a sense of freedom in making decisions, which, not coincidentally, is the primary motivation for using mobile applications. In this regard, it is recommended that applications be designed to meet the needs of workers for viewing and logging performance outcomes and related results. For instance, development of an application's record-keeping facilities may enhance employees' autonomy needs satisfaction with the platform.

Second, the results also show positive correlations among the satisfaction of individuals' basic psychological needs for competence and relatedness and individuals' levels of motivation in the context of mobile application usage. Accordingly, if a delivery worker thinks they have the competence to use a mobile application, then they will be more motivated to struggle through learning to use it and will want to work more to achieve better results through the mobile application. At the same time, using a mobile application can help employees monitor their profits intuitively. In turn, these rewards will increase food delivery workers' intrinsic motivation. Also, because food delivery workers are paid per the completion of orders, delivery workers who deliver more orders will earn more money; such a formula directly and quickly reflects the abilities and satisfies the competence needs of delivery workers. As a result, application developers should consider giving food delivery workers more space in applications to demonstrate their abilities (e.g., a feature for individuals to showcase their delivery volumes in an app) as a way of receiving ready affirmation. This will increase competence needs satisfaction with mobile applications for food delivery providers.

Last, the motivation of delivery employees to use mobile applications depends on the mobile apps' ability to satisfy the employees' basic psychological need for relatedness. If a delivery worker feels capable while using an application, then they will be more willing to communicate with other members, in turn promoting the satisfaction of their relatedness needs. Meeting relatedness needs can be associated with achievement (e.g., ranking), insofar as a sense of accomplishment can activate a sense of connection. However, the biggest impact should be social-related. These factors encourage employees to pay more attention to applications and take advantage of opportunities to connect with customers and businesses. To do this, the field first needs to create a more diverse community of applications in which users can share their lives and interact with other employees. For their part, customers can engage with the community by "liking" or publishing comments on content. In this way, the community not only inspires and acknowledges its members to one another but also encourages workers through motivational feedback. To facilitate this relatedness, an annual evaluation can be established so that food delivery workers can relate to each other. With mobile applications, delivery workers can achieve positive relationships (by way of competition or collaboration). Simply, the results of this study allow us to determine that mobile applications are related to satisfaction of three innate psychological needs.

#### 4.3. Limitations and future research

Findings from this research help us better understand the psychological dynamics of food delivery employees and offer implications for future research. Respondents were asked to answer questions about the delivery platform they had most recently worked for, and future studies should examine differences across platforms. Also, future studies can focus on specific delivery brands to obtain a more focused view of targeted platforms. This research was conducted among US respondents and focused on US delivery platforms. Insofar as employee behaviors are associated with culture, additional research is needed in different cultures and geographic regions to better understand the generalizability of the findings reported herein.

#### Ethics declarations

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee.

#### Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

#### Informed consent

Informed consent was obtained from all individual participants in the study.

#### Declaration of competing interest

There is no conflict of interest to disclose.

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