



# Big data in an HR context: Exploring organizational change readiness, employee attitudes and behaviors



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## ABSTRACT

This research highlights a contextual application for big data within a HR case study setting. This is achieved through the development of a normative conceptual model that seeks to envelop employee behaviors and attitudes in the context of organizational change readiness. This empirical application considers a data sample from a large public sector organization and through applying Structural Equation Modelling (SEM) identifies salary, job promotion, organizational loyalty and organizational identity influences on employee job satisfaction (suggesting and mediating employee readiness for organizational change). However in considering this specific context, the authors highlight how, where and why such a normative approach to employee factors may be limited and thus, proposes through a framework which brings together big data principles, implementation approaches and management commitment requirements can be applied and harnessed more effectively in order to assess employee attitudes and behaviors as part of wider HR predictive analytics (HRPA) approaches. The researchers conclude with a discussion on these research elements and a set of practical, conceptual and management implications of the findings along with recommendations for future research in the area.

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## 1. Introduction

Organizations are increasingly having to manage and deal with rapid changes in technology, challenges to strategic capability and emerging trends in how employees as well as stakeholders (and customers) communicate and wish to engage with each other. This, coupled with increasing market and competitor demands suggests that the need for organizational change is indeed an ongoing and an unavoidable and necessary process (Drucker, 1999) which the modern firm must recognise (Sturdy and Grey, 2003). In doing so however, also realising that such change affects the organization internally through an increase in uncertainty, anxiety, stress and resistance (Conway and Monks, 2011; Weber and Weber, 2001). These employee-based factors are subsequently critical to the success or failure of organizationally-driven change programmes.

To this extent the dominant focus of change and how it is managed within organizations remains at the level of employee engagement – who, in terms of adopting change may develop positive or negative attitudes, beliefs and intentions towards the organization as change is implemented. In terms of the former aspects, there is debate among

practitioners and researchers on the development of employee attitudes towards behaviors such that they are receptive towards organizational change (Armenakis et al., 1993; Bernerth, 2004; Elias, 2009; Holt et al., 2007; Rafferty and Simons, 2006; Shah and Shah, 2010). In addition, research on employee readiness for organizational change has also sought to focus on antecedents related on external organizational pressures, internal context enablers and personal characteristics (as shown in Fig. 1). The success of organizational and employee-driven change has in a very limited sense included aspects of what is commonly understood as expectation theory into account sufficiently in terms of change readiness (Cunningham et al., 2002; Eby et al., 2000; Neves, 2009; Rafferty and Simons, 2006).

The extant literature proposes that employees themselves are directly dependent upon themselves in order to maintain, sustain and accomplish successful organizational change (Armenakis et al., 1993; Cinite et al., 2009; Holt et al., 2007). For example, employees with different cognition levels can visualize the situation within their organization and environment by comparing past and anticipated future perspectives. Thus, in order to chart successful change strategies understanding employee attitudes and behaviors is useful which can bring together disparate yet related contextual drivers.

It is suggested that employees' insights tend to be conceptualized with attitudinal and behavioral aspects towards the organization – which in turn can be based upon a number of different influencing factors both internal and external to the company (Morgan and Zeffane,

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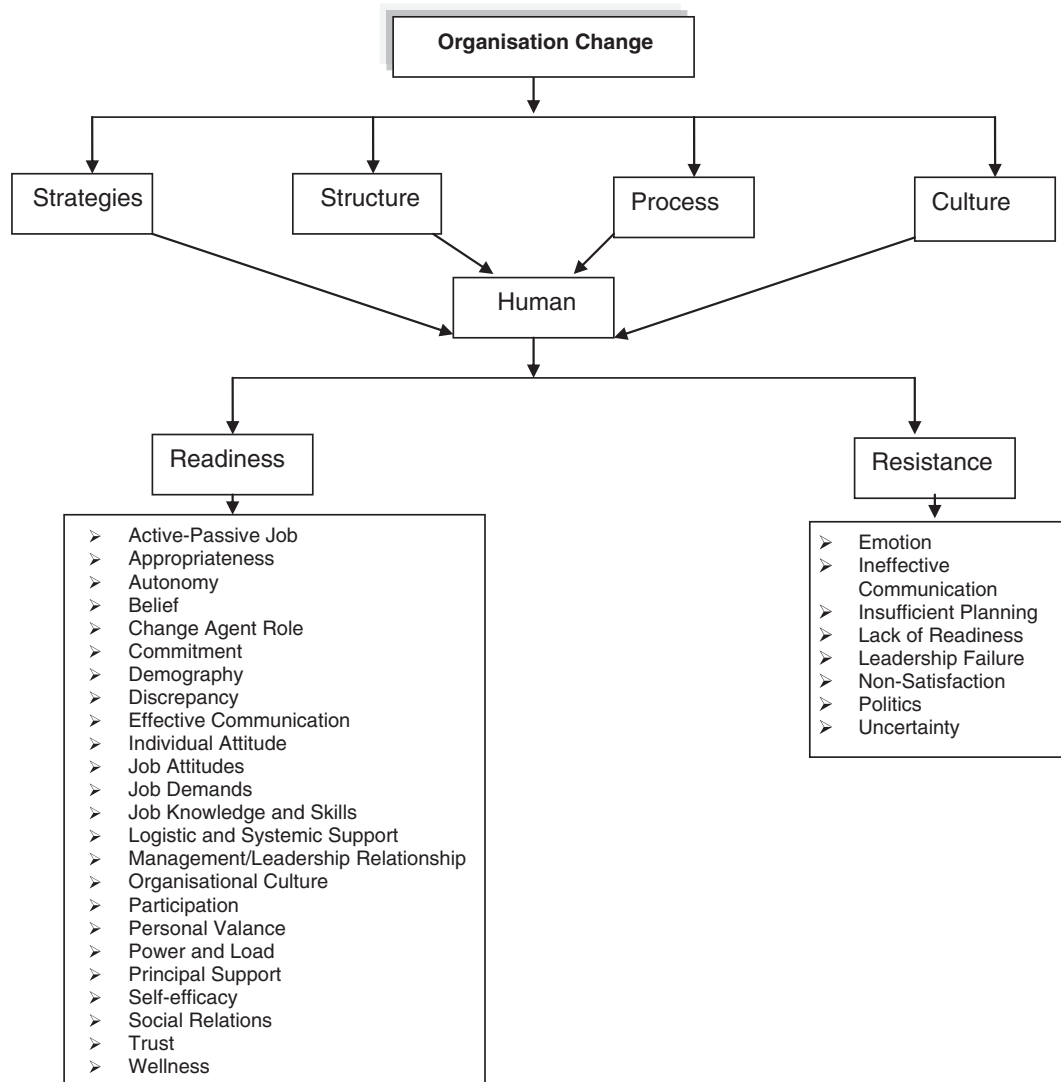


Fig. 1. Organization change nomenclature.

2003; Randall et al., 1999). As a result, the literature highlights that job satisfaction is a key driver underpinning attitudes and behaviors in the workplace (Alegre et al., 2016; Rayton and Yalabik, 2014; Topolosky, 2000) where this relates to how employees think, feel and perceive their jobs (Oliver, 1990; Randall et al., 1999; Spector, 1997). However whilst this shows a dearth of objective factors which relate to organizational change, much of the research in the field of change management does not explicitly examine or relate job satisfaction factors with employee attitudes and behaviors – much less even extend additional indirect company environmental vectors (Caldwell and Liu, 2011; Cinite et al., 2009; Cunningham et al., 2002; Holt et al., 2007; Rafferty and Simons, 2006).

In order to bridge this divide and to offer new insights into how incongruent firm- and employee-level factors may further be supported this research applies concepts of big data and related HR Predictive Analytics (HRPA) in support of calls from the literature to support employee motivation and engagement as part of organizational change and readiness programmes (Cunningham et al., 2002; Heckmann et al., 2015; Mohamed et al., 2013).

Big data has been defined in many ways within the literature to date but briefly defines and determines large, unstructured (and in many cases unrelated) datasets which are complex to analyse and process,

but which can add value to a firm's productivity and operations (Manyika et al., 2011; Marr, 2015). Hence whilst Volume is an inherent property of big data, several other properties are also important for data-driven companies (McAfee and Brynjolfsson, 2012), including, among others: Variety (type and nature of data); Velocity (the speed at which structured and unstructured data is generated through internal and external sources); Variability (consistency of the data); and Veracity (quality of the data). Additionally according to Chen et al. (2012: 1182): "In the age of big data ... the emphasis in industry has shifted to data analysis and rapid business decision making based on huge volumes of information". As such the analysis of such data is also important, known as Predictive Analytics (Finlay, 2014) wherein the extraction of relevant and useful information allows the forecasting of trends and other patterns, through statistical, machine learning and other computationally intensive techniques.

The advent of big data and the access to a growing volume of data means that companies now have access to a potentially large and diverse set of information that can be inter-related together to derive new insights for operational as well as strategic means (Brynjolfsson and Saunders, 2009; Laney et al., 2013). In this sense the authors believe that as part of organizational change processes, using principles and concepts of big data may give a new depth and insight to exploring

employee attitudes and behaviors in support of organizational change efforts as identified by Eby et al. (2000), Elias (2009). This is also given that the nature of work change has is also related to changes in employees themselves (Williams, 2001).

The authors therefore posit that the expectations of individuals in their employment situation – which can draw upon a wide variety of organizational data within and without of the firm and exhibits a voluminous amount of data - can support the development of attitudes and behaviors underpinning organizational change. The significance of this study is that although much empirical research on employee readiness for organizational change has been conducted (Cinite et al., 2009; Eby et al., 2000; Holt et al., 2007; Madsen et al., 2005; Rafferty et al., 2013), empirical examinations of employee attitudes and behaviors towards organizational change through job satisfaction have been limited.

In meeting the above aims, the authors firstly contrast the influence of behavioral (extrinsic) and attitudinal (intrinsic) factors on employee reactions to change, noting that despite the prevalence of readiness change factors, researchers have not systematically tested the combined influence of both behavioral (extrinsic) and attitudinal (intrinsic) factors during organizational change (Armenakis et al., 1993; Chang, 1999; Elias, 2009). Following this, the authors demonstrate how employees' mental templates affect their choice to engage in organization goals, wherein the theoretical importance of the context of readiness to change is discussed (Armenakis et al., 1993; Bernerth, 2004; Desplaces, 2005; Smith, 2005; Choi and Ruona, 2011) and a rationale for developing an empirical investigation approach is provided with resulting findings from a public sector case organization where organizational change was in effect. This further supports the literature and topical debate in the field which asserts that attitudes and behaviors can be developed by a choice of employees, rather than a forced adaptation, as attitudes are generally reflected through salary, job promotion, organizational loyalty and organizational identification factors.

However noting that employees exist within a wider ecosystem beyond the confines of the organization, the authors subsequently suggest that an understanding of employees' overall mental templates may affect organizational change. Hence reframing the empirical findings in terms of a wider big data and predictive analytics context, may offer additional and novel insights to how employee readiness can be supported. Thus offering a contribution to the application of big data to social science and business problems where organizational culture, employee behaviors and employee intentions play a leading role. The authors subsequently believe this practical research knowledge can be useful in developing future organizational policies and procedures for change management where employee satisfaction, behaviors and attitudes can be augmented with non-organizational data and factors (i.e. supported through the lens of big data).

### 1.1. Conceptual development and hypotheses

Change is inevitable due to both anticipated and unforeseen pressures that can push organizations to take remedial action in the form of alteration, modification or variation in its structures, policies, strategies, approaches or culture. It is increasingly effect feature of organizational life (Conway and Monks, 2008; Raineri, 2011) that may be planned or unplanned but is associated with conversion or movement from one point to another (Barnett and Carroll, 1995). However, the impact of this may be on the organization, the employees or the business. In the literature, researchers tend to argue that organizations merely announce changes but implement through their employees, and its success will depend upon if and whether individuals alter their working practices in appropriate ways (Chang, 1999; Elias, 2009; Porras and Robertson, 1992; Raineri, 2011). Specifically, many research projects fail because of an underestimation of the central role of individuals in the change process.

Extracting knowledge of individuals from big data and analysis in different related organizational factors may help to understand their attitudes and behaviors. A wide variety of literature focuses on both macro and micro level perspectives of change. Armenakis and Bedeian (1999) focuses on change content, context, process and criteria issues relating to a macro-level system orientation. However, due to sensitivity towards change failure or an inability to achieve the intended change aims, a number of researchers like Choi and Ruona (2011) and Greenhalgh et al. (2004) focus on micro-level perspectives of change. The dominant focus is to understanding the individual's behavior as Porras and Robertson (1992; p.724) state: "change in the individual organizational member's behavior is at the core of organizational change".

In fact, the success of change in organizations depends on their employees principally because organizations only announce change but implementation is carried out by their employees and will continue over a long period. Regardless of the necessity and inevitability of change, researchers like Tetenbaum (1998) and Cunningham et al. (2002) emphasize that organizations must consider employee readiness factors for implementation of successful change. The readiness concept is defined as a belief, intention, and attitude regarding the extent to which change is needed (Armenakis et al., 1993; Rafferty and Simons, 2006; Susanto, 2008). This concept connects with the employees either to be supportive or resistant which shows the individual's behavioral aspects of change. In the literature, many researchers empirically support the individual's role in their respective organizations. For example, Hanpachern, Morgan, and Griego (1998) find a supportive relationship of employee openness with job knowledge and skills, social relationships in the workplace, organizational culture, management leadership relationships and demographic variables. Cunningham et al. (2002) extend our understanding that workers who have an active approach to solving job problems with higher job change self-efficacy are more ready for change. Active jobs that place higher demands and offer greater decision-making latitude also tend to show more readiness for organizational change. Similarly, others like Holt et al. (2007) and Miller et al. (2006) conclude that management and leadership relationships, job knowledge and skills, job demands, employee beliefs of self-efficacy, appropriateness, management support, and personal valence have a significant influence on employee readiness for change.

The researchers revealed huge literature and expose many factors reflecting human attitudes, intentions and beliefs (see Table 1) because of their different individual life experiences, motivational levels, socio-demographic characteristics, knowledge, attitudes, support systems, values, and behavioral patterns (Ilgen and Pulakos, 1999). However, development of database system of employees through advanced information technologies may help to understand their attitudes and behaviors during organizational change. Big data analysis may pose significant impact over the change process. Before starting change process, an immense amount of employees' information can be gathered through the use of web and visualized through different techniques.

This study focuses on sets of expectation that can affect employee job satisfaction during change situations because "individuals bring prior orientations and experiences to their jobs that may affect their expectations of or predisposition to their work" (Metle, 2001; p-324). Moreover, job satisfaction is a key player in the study of human behavior at work and is treated as a critical challenge for management because of its effect on employee turnover and absenteeism (Abbas et al., 2014; Hartmann et al., 2014; Khowaja et al., 2005; Miller, Rutherford, and Kolodinsky's, 2008), procedural justice and on job training (Halepota and Shah, 2011; Shah, 2011) and intention to stay, organizational commitment and trust (Schreurs et al., 2015; Sourdif, 2004; Top et al., 2015). Researchers reveal that employee job satisfaction relates to how individuals think and feel about their jobs (Alegre et al., 2016; Oliver, 1990; Randall et al., 1999; Spector, 1997) because it can impact on

**Table 1**  
Classification of employee readiness factors.

Category	Factor(s)	Reference(s)
1. Workplace factors	Active and passive job	Cunningham et al. (2002), Miller et al. (2006)
	Appropriateness	Armenakis and Harris (2002), Holt et al. (2007), Weber and Weber (2001)
	Change efficacy	Armenakis and Harris (2002), Holt et al. (2007), Lehman et al. (2002)
	Communication	Armenakis and Fredenberger (1997), Holt et al. (2007), Wanberg and Banas (2000)
	Decision latitude	Cunningham et al. (2002)
	Discrepancy	Armenakis and Harris (2002), Armenakis et al. (1993)
	Flexible policies and procedures	Eby et al. (2000), Rafferty and Simons (2006)
	Job demands	Cunningham et al. (2002), Hanpachern et al. (1998), Miller et al. (2006)
	Job knowledge and skills	Cunningham et al. (2002), Hanpachern et al. (1998), Miller et al. (2006)
	Logistic and system support	Eby et al. (2000), Chung, Du, and Choi (2013), Rafferty and Simons (2006)
	Management and leadership relationships	Hanpachern et al. (1998), Miller et al. (2006)
	Organizational commitment	Drzensky et al., (2012), Elias (2009), Fuchs and Edwards (2012), Madsen et al. (2005)
	Organizational culture	Hanpachern et al. (1998), Lehman et al. (2002), McNabb and Sepic (1995)
	Perceived organizational support	Eby et al. (2000), Holt et al. (2007), Rafferty and Simons (2006)
	Personal valence	Armenakis and Harris (2002), Holt et al. (2007)
	Social relations in the workplace	Hanpachern et al. (1998), Madsen et al. (2005)
	Social support	Cunningham et al. (2002), Madsen (2003), Wanberg and Banas (2000)
	Wellness	Shah (2011), Fuchs and Edwards (2012)
	Justice	Fuchs and Edwards (2012)
	2. Individual factors	Adaptability
Autonomy		Weber and Weber (2001)
Beliefs		Peach et al. (2005)
Demography		Hanpachern et al. (1998), Holt et al. (2007), Madsen et al. (2005), Wanberg and Banas (2000), Weber and Weber (2001)
Depression		Cunningham et al. (2002)
Emotional exhaustion		
General attitude		Holt et al. (2007)
Job related attitude		Katsaros and Tsirikas, and Bani (2014)
Intention to quit		Wanberg and Banas (2000)
Self-efficacy		Armenakis and Bedeian (1999), Cunningham et al. (2002), Eby et al. (2000), Lehman et al. (2002), Rafferty and Simons (2006), Wanberg and Banas (2000)
Job satisfaction		Abbas et al. (2014), Rayton and Yalabik (2014), Wanberg and Banas (2000)
Participation		Armenakis and Fredenberger (1997), Cunningham et al. (2002), Eby et al. (2000), Rafferty and Simons (2006), Wanberg and Banas (2000), Weber and Weber (2001)
Personal resilience		Holt et al. (2007)
Rebelliousness		Eby et al. (2000)
Skills variety		Weber and Weber (2001)
Supervisory support		Eby et al. (2000)
Team work		Eby et al. (2000), Rafferty and Simons (2006), Weber and Weber (2001)
Trust (in peers; management; senior leaders)		
Turnover		Wanberg and Banas (2000)
Work irritation		
Affective commitment	Elias (2009)	
Personality	Caldwell and Liu (2011)	
Training	Halepota and Shah (2011)	

quality of life and overall happiness (Frey and Stutzer, 2010). From this concept, the authors of this paper assume that during organizational change, if employees have positive attitudes and feelings about his or her job, he or she can accept organizational change. Thus, the authors follow the argument made by Oliver (1990), Mullins (1999) and Randall et al. (1999) that employee job satisfaction can develop positive attitudes and behaviors towards the organization or work. Employees' behavioral approach is related to employee sense of attachment to the organization's actions (Oliver, 1990) with reference to salary/wages, rewards, tenure, promotion or any other financial benefits. However, the attitudinal approach seeks to identify the nature and quality of the relationship between an employee and an organization (Oliver, 1990). To a large extent, earlier approaches provide substantial support to understanding the individual's attachment in terms of beliefs, willingness, and desire to maintain membership of an organization during the change process. Hence, most important thing an organization can do with big data is to employ it in developing individuals' attitudes and behaviors.

Keeping the concept of big data analysis in mind the authors develop a conceptual model based on the needs and expectations of people to understand behavior and attitude at work (Fig. 2). The

model develops in such a way that the behavioral aspects (salary and promotion) and attitudinal aspects (organizational loyalty and organizational identification) exert a direct effect on job satisfaction and thus on employee attitudes, intentions and beliefs towards organizational change.

In order to get a supportive response towards organizational change, management need to develop relationships of trust with its employees. However, these relationships can be developed by aligning the mutual interests of organizations and employees on the basis of certain expectations, needs and desires. Researchers try to explore possible predictors related to developing supportive environments that may induce employees to utilize their abilities, efforts and skills to embrace organizational objectives (Penley and Gould, 1988; Yoon and Thye, 2002). Despite a substantial number of ideas in developing positive attitudes and behaviors in the change domain, the central ideas of economic reward and intrinsic satisfaction of the employee does not integrate in employee satisfaction towards change readiness in developing countries. On the whole, employee economic reward (financial) relates with employee behavior and intrinsic satisfaction (psychological) aspects connect with employee attitudes (Chang, 1999; Mullins, 1999). In any organization, employees offer their abilities, skills and energies

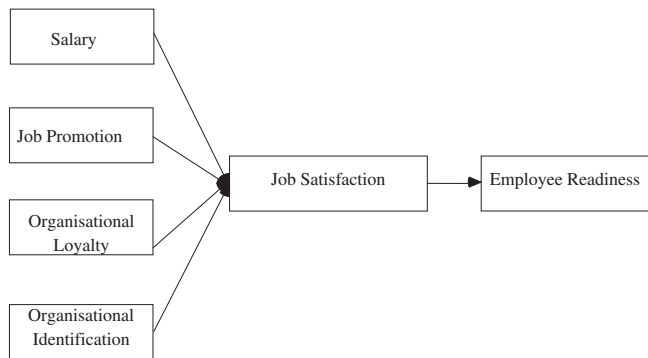


Fig. 2. Conceptual model.

in exchange for economic reward. From this perspective, employees' behavioral approach towards the organization appears to be one of exchange. This has importance for the managers to locus of big data of individuals driven from the web and reveals their skills and experiences. Researchers note that employee behavior depends upon the means that an organization provides to its employees (Blau, 1964; Penley and Gould, 1988) and base on that, employees' perceptions may be receptive for the organization change. Penley and Gould (1988: 44) posit that an employee exchanges his or her contribution for the inducements provided by an organization. In the literature, higher salary has been used to motivate employees for task performance and staff retention (Chang, 1999; Mottaz, 1988; Poon, 2004). In view of exchange, an organization may treat its employees favourably and realizes its obligations in a way that benefits the organization. The idea is that if an organization considers increasing employees' salaries in order to implement changes then employees are likely to develop positive behavior towards the organizational change. Our assumption is that the salary context affects employee behavior towards organizational change.

Apart from salary, promotion is also an important organizational issue for employees because they have to manage their professional careers. In the literature, promotion is assumed to be one form of employee selection (Garcia-Izquierdo et al., 2012). Moreover, researchers consider promotion as a career outcome that refers to an employee's feelings of accomplishment with his or her career (Judge et al., 1995; Poon, 2004). Thus, it is perceived that the opportunity for promotion is related to psychological attachment to the organization. To this extent, an employee considers promotion to be based on their experience and performance. Development of advanced information technology knowledge can be gained to understand the individual's behaviors and attitudes. Previous research on promotion suggests it is based on job satisfaction (de Sousa, 2002; Kosteas, 2011), but to the best of our knowledge, no one has yet tested the effect of promotion on employee attitudes and behavior towards organizational change. We argue that promotion may be interpreted by the employee as sign of organizational support during the organizational change process.

However, in the current situation where economic, financial and environmental dimensions are more fragile, these factors may have a greater effect on the individual's cognition level. In such fragile situations, the notion of wishing for a higher salary or job promotion may support the accomplishment of the desired employee behaviors. Domain researchers and practitioners advocate economic rewards, such as salary and job promotion, as essential for gauging the relationship between an employee and an organization (Chang, 1999; Gaertner and Nollen, 1989; Poon, 2004; Shah and Irani, 2012). With the support of the literature, the authors suggest that, if an employee develops positive behaviors towards his or her job, he or she may be more willing to accept organizational change. On the basis of this conceptualisation, we propose the following hypotheses.

**H1.** Salary will serve as an antecedent of employee job satisfaction.

**H2.** Job satisfaction will mediate between salary and employee readiness for change.

**H3.** Job promotion within an organization will serve as an antecedent of employee job satisfaction.

**H4.** Job satisfaction will mediate between job promotion within the organization and employee readiness for change.

Employees develop relationships with an organization on the basis of reputation, recognition, future development and progression. However, employees' attitudinal approach is related to the psychological perspective. In other words, this approach may show higher levels of expectation and requirement from the organization with which an employee may forge a relationship. As already indicated, a positive employee attitudinal approach can be developed on the basis of intrinsic satisfaction (Chang, 1999; Mullins, 1999). Intrinsic satisfaction is concerned with psychological motivation which can be derived from the nature of the work itself, interest in the job, and opportunities for personal growth and development (Mullins, 1999: 407). In this regard if the organization has data about its employees from the total rewards, texts, and loyalty may be support to organizational smooth changes. Effective managers have already big data considering employees intentions to get support to justify organizational efforts. The literature supports the notion that intrinsic motivation is one of the vital and supportive elements of an employee's attitudinal approach towards an organization (Chang and Chang, 2007; Edwards and Peccei, 2010).

Employees' emotional attachment to and identification with an organization is concerned with an understanding of organizational goals and values. In the literature, an employee's emotional attachment is associated with organizational loyalty or willingness to dedicate more efforts towards an organization, and organizational identification is concerned with a feeling of pride or a desire to retain a connection with the organization (Chang and Chang, 2007; Chun et al., 2010; Cook and Wall, 1980). Several studies support the idea that a positive employee attitudinal approach depends upon employee loyalty (emotional attachment), identification (feeling of pride) and involvement (personal sense of obligation) (Cook and Wall, 1980; Madsen et al., 2005). A large body of literature is available to examine employee attitudes within organizations. This includes participation in decision-making (Kim and Mauborgne, 1998), good communication (Konovsky and Cropanzano, 1991), autonomy, task significance, task identity, skill variety, supervisory feedback, organizational dependability, and perceived participatory management (Mottaz, 1988) – as well as evaluation of strategic factors (Sharif and Irani, 2006) and employee and management commitment factors (Irani et al., 2014). Indeed, the consequence of these attitudinal aspects, correctly applied, is employee retention (Meyer et al., 1993), attendance, job performance and good organizational citizenship behavior (Herscovitch and Meyer, 2002).

Indeed, very precise predictions have been given between emotional attachment, organizational identification and job satisfaction (Chang and Chang, 2007; De Moura et al., 2009). In a recent study, Fuchs and Edwards (2012) examine the relationships between pro change behavior and interpersonal justices through the mediation of organizational identification and found partially mediated. In another study, Drzensky et al., (2012) find a positive relationship between organizational identification and employee readiness for change. On the basis of mutual understanding, an employee develops an attachment to an organization, and identifies with and becomes involved in the activities of the organization. Employees who receive encouragement to change are more likely to act voluntarily in support of organizational change goals that contribute to overall organizational effectiveness (Organ,

1988; VanYperen et al., 1999). Such encouragement is related directly or indirectly to employee organizational loyalty and identification. With the help of this concept, the authors set out the following hypotheses.

**H5.** Organizational loyalty will serve as an antecedent of employee job satisfaction.

**H6.** Job satisfaction will mediate between organizational loyalty and employee readiness for change.

**H7.** Organizational identification will serve as an antecedent of employee job satisfaction.

**H8.** Job satisfaction will mediate between organizational identification and employee readiness for change.

## 2. Methods

### 2.1. Data collection and sample

This research focuses on the academic staff of public sector higher educational institutions in Pakistan. At the time of data collection, these institutions were undergoing a major restructuring process. The restructuring involves designing new structures for staff salaries, promotions, research and job tenure (irrespective of permanent tenure). These changes aim to improve the performance of staff to face new world trends and economic changes particularly for the country. Because this change potentially affects all academic staff in these organizations, we target employees from around the country. We ask the administration of the institutions to provide lists of employees and also confirm lists of names with postal and email addresses from the institutions' websites. We focus on 1000 participants who are involved in the change process. Before distributing the survey, the researchers began by contacting randomly selected participants to ascertain their willingness to participate in the research and to deal with any queries regarding the instrument and privacy. After gaining an affirmative written response, each participant was sent a pack which included an English language survey questionnaire, a formal consent form and a covering letter by post or personal visits at their place of work. As part of the instructions, participants were told that participation was optional. To ensure confidentiality, a return postage paid envelope was sent to the participants. Ethical approval for the study was granted by the relevant authority.

The survey resulted in 556 returns, demonstrating a return rate of nearly 56%, which is a good response rate for organizational research (Baruch and Holtom, 2008). Of these, 518 questionnaires yielded usable data. Demographic details show that 61.8% ( $n = 315$ ) are male, and that 35.9% ( $n = 186$ ) are between 31 and 40 years of age. The majority (60.2%,  $n = 312$ ) of the participants are married and most of them (30.1%,  $n = 154$ ) have three to four dependents. About 42% ( $n = 217$ ) have a Master's degree as the highest educational qualification. The majority of respondents (36.5%,  $n = 189$ ) remain in their present job for one to five years and most of them (26.8%,  $n = 139$ ) work with their present employer for the same period.

### 2.2. Study variables

This research empirically tests a conceptual model connect with employees' economic rewards and intrinsic satisfaction factors to understand the employees' readiness for organizational change. The design of questionnaire aim to understand employees' attitudes and behaviors towards change. The process of developing the survey instrument base on the type of information required. In this research, employee's job salary, job promotions, organizational loyalty and

identification uses as independent variables and readiness to change serves as a dependent variable. However, job satisfaction factor uses as a mediatory factor to examine employees' attitudes and behaviors regarding organizational change programmes. These variables carry out with many options of Likert Scales for the variety of choice of individuals. The questionnaire was pre-tested in a pilot study and factor analysed to assess uni-dimensionality. The variables are described below.

#### 2.2.1. Readiness for organizational change

Readiness for organizational change assesses via 14 items (see Madsen et al., 2005) and originally reported by McNabb and Sepci (1995). Participants were asked to tick one of seven numbers on a Likert scale (1 = very unlikely to 7 = very likely). Sample items from this scale includes "My willingness to work more because of the change is..." and "My willingness to find ways to make the change fail is...". Cronbach's alpha for the scale in the present study is 0.94.

#### 2.2.2. Job satisfaction

Job satisfaction measures with seven items from Brayfield and Rothe (1951). Sample items from this scale are "My job is like a hobby to me" and "I find real enjoyment in my work". Cronbach's alpha for the scale in the present study is 0.90.

#### 2.2.3. Salary

Salary measures by applying five items from Price and Mueller (1986) modified by Yoon and Thye (2002). An example item from this is "Compared to other employees, my pay is appropriate in view of my input". Cronbach's alpha for the scale in the present study is 0.89.

#### 2.2.4. Job promotion

Here four items apply as used by Chang (1999) based on Gaertner and Nollen (1989). A sample item is 'This organization prefers to promote from within'. Cronbach's alpha for the scale in the present study is 0.88.

#### 2.2.5. Organizational loyalty

Loyalty measures via a three-item scale as developed by Cook and Wall (1980) and factor analysis conducted by Mathews and Shepherd (2002). A sample question is "I sometimes feel like leaving this employment for good". Cronbach's alpha for the scale in the present study is 0.86.

#### 2.2.6. Organizational identification

Identification examines using a three-item scale as developed by Cook and Wall (1980) and factor analysis conducted by Mathews and Shepherd (2002). A sample item from this scale is "I am quite proud to be able to tell people who it is I work for". The researchers use a five-point Likert Scale (Strongly Disagree to Strongly Agree) for all the above variables. Cronbach's alpha for the scale in the present study is 0.86.

### 2.3. Data analysis

First, the authors check the data for violation of the assumptions of normality, linearity, homoscedasticity and multi-collinearity. No major problems evident after taking out missing and outlier participants. Second, in order to provide basic information about the scales, the descriptive statistics calculate ("i.e." means; standard deviations). Third, the strength of the linear relationships among the variables examine via Pearson's correlation (Gall et al., 2003). Next, a principal component analysis uses to determine that the factor analysis for the measures are empirically different from each other and conceptually validated. Moreover, the survey questionnaire reliability and validity assesses by applying exploratory factor analysis follows by confirmatory factor analysis (Diamantopoulos and Siguaw, 2000; Hair et al., 2006). We use two different models that distinguish between direct and indirect models where the significant total relationship that exists between an

independent and dependent variable is accounted for a mediator variable (Mathieu and Taylor, 2006).

Finally, the relationship between the constructs test using analysis of moment structures (AMOS) through structural equation modelling (SEM). The authors use the maximum likelihood estimation procedure for analysis of moment structures (AMOS) 21.0 version software in order to assess the model fit of the study and to test the hypotheses (Hair et al., 2006; Tabachnick and Fidell, 2007). We apply the questionnaire to single respondents, which is an important point to note. Podsakoff and Organ (1986) suggest using Harman's one-factor test in order to examine the extent to which common method bias present in the dataset. The results of the test shows five factors in which common method bias does not appear to be a problem, with the first factor explains 36% of the variance.

### 3. Results

The descriptive statistics, reliability coefficients, and correlation coefficients of each variable can be seen in Table 1. The result of Pearson's correlation shows that all the independent factors have positive and significant correlations with the dependent variables, and find the highest relationships between readiness for organizational change, job satisfaction and salary. A significant, negative relationship finds between loyalty and identification. However, no relationship finds to be  $>0.70$ ; therefore, there is no need to determine multi-collinearity, which is required when two predictors correlate more strongly than 0.70 (Vogt, 2007).

#### 3.1. Exploratory factor analysis (EFA)

EFA conducts to assess the dimensions of each scale before estimation of confirmatory factor analysis (CFA). By using principal component analysis with a varimax rotation, factors load. The results show that factor one (readiness for organizational change), loads on seven original items. Factors two and three (job satisfaction and salary) loads on their four original items. Factors four, five and six (promotion, identification, loyalty) loads on all three original items. The variance explains by each factor is 32.67% for readiness for change, 10.67% for job satisfaction, 9.27% for salary, 8.29 for promotion, 7.73 for identification and 6.59% for loyalty. The cumulative variance explains 75.24% in total.

#### 3.2. Confirmatory factor analysis (CFA)

The factors subject to EFA confirm by CFA using the AMOS (version 21.0) program. Consistent with SEM literature, a non-significant goodness-of-fit  $\chi^2$  statistic, a root mean square of approximation (RMSEA) below 0.08, and an adjunct fit of indexes above 0.90 will serve as the criteria for a model to achieve a desirable fit to the observed data (Kline, 1998). Two measurement models develop to estimate the model good fit. The first measurement model is the alternative model

which has no mediation and no any paths and the second hypothesize model with mediation and no added paths. In this study, alternative model fit data shows that the model is not a good fit than to hypothesize (mediated) measurement model (see Table 2). (See Table 3.)

#### 3.3. Test of the proposed model fit and hypotheses testing

A structural equation modelling approach applies to test the proposed models (alternative and hypothesised) fit and hypotheses. The results of alternative model indicates no fit the data well (see Table 2). However, the hypothesised structural mediates model indicates that the model fitted the data well, where the fit chi-square value is 379.405 with 241 degrees of freedom, the chi-square value/degree of freedom = 1.574, RMSEA = 0.033, GFI = 0.944, AGFI = 0.930, CFI = 0.982.

The results of testing the eight hypotheses using path estimates and t values (critical ratio =  $t_{critical}$ ) shows in Fig. 3. The t values for the five factors of salary, promotion, organizational loyalty, organizational identification and job satisfaction are above the 1.96 critical values ( $p \leq 0.01$ ). The examination of regression weights reveal that the salary construct has the highest impact on job satisfaction to employees' readiness for organizational change ( $\beta = 0.432, p < 0.01, t_{Salary} = 6.871$ ) and job satisfaction and employee readiness fully mediates by employee salary; thus, H1 and H2 are accepted. The influence of the second independent predictor, promotion, also finds to be positive and significant to job satisfaction ( $\beta = 0.089, p < 0.01, t_{Promotion} = 2.204$ ), and job satisfaction and employee readiness fully mediates by employee job promotion; therefore, H3 and H4 are accept. The influence of the third independent predictor, organizational loyalty, also find to be positive and significant to job satisfaction ( $\beta = 0.123, p < 0.01, t_{Loyalty} = 2.952$ ) and job satisfaction and employee readiness fully mediates by employee organizational loyalty; therefore, H5 and H6 are accepted. The fourth factor, organizational identification, confirm as having a significantly positive impact on job satisfaction ( $\beta = 0.122, p < 0.01, t_{Identification} = 2.646$ ) and job satisfaction and employee readiness fully mediates by organizational identification; hence, H7 and H8 are accepted. (See Fig. 3.)

#### 3.4. Analysis and findings: Empirical model

The research in this paper has provided empirical evidence that shows how economic rewards and individual's intrinsic satisfaction may increase significant and positive employee attitudes and behaviors towards organizational change. We propose that as employees become more satisfied with the sense of attachment and quality of the relationship with the organization, their support for change will increase. Accordingly, management should pay attention on both the attitudinal and behavioral factors to influence positively employees' attachment in terms of willingness and desire to maintain membership during organizational change.

**Table 2**  
Descriptive statistics, reliability and Pearson correlations ( $N = 518$ ).

Variable	M	SD	1	2	3	4	5	6	AVE	CR	$\alpha$
1 Readiness for organizational change	5.77	1.24	–						0.67	0.93	0.94
2 Job satisfaction	4.01	1.05	0.518**	–					0.65	0.88	0.90
3 Salary	3.85	0.95	0.418**	0.364**	–				0.63	0.87	0.89
4 Job Promotion	3.85	1.45	0.232**	0.173**	0.238**	–			0.78	0.90	0.88
5 Organizational loyalty	3.88	1.18	0.201**	0.143**	0.136**	–0.049	–		0.76	0.88	0.86
6 Organizational identification	4.12	0.99	0.241**	0.152**	0.152**	0.068	–0.087*	–	0.76	0.90	0.86

Note: M = mean, SD = standard deviation, AVE = average variance extracted, CR = composite reliability, alpha = Cronbach's coefficient alpha.

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

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

**Table 3**  
Fit indices for hypothesised and alternative models.

Models	$\chi^2$	df	$\chi^2/df$	GFI	AGFI	CFI	RMSEA
<i>Measurement model</i>							
Alternative model (no mediation with no added paths)	514.306	196	2.624	0.913	0.867	0.812	0.075
Hypothesised model (full mediation with no added paths)	705.306	252	2.799	0.912	0.911	0.941	0.059
<i>Structural model</i>							
Alternative model (no mediation)	285.315	201	1.419	0.881	0.911	0.912	0.091
Hypothesised model (full mediation)	379.405	241	1.574	0.944	0.930	0.982	0.033

The research findings suggest that employee's job salary and promotion have positive and significant relationship with the job satisfaction and readiness to change. This provides sufficient support to the general literature which suggests that tangible (economic) rewards generally facilitate and motivate employees in task performance and maintenance of organizational membership (Chang, 1999; Gaertner and Nollen, 1989; Mottaz, 1988). When the authors examine the relationship of the economic reward factors, salary have the strongest correlation with job satisfaction and readiness for change. However, salary directly contributes to employee job satisfaction and indirectly to employee readiness for organizational change. Thus, the importance of economic reward suggests that raising salaries during organizational change may be an appropriate strategy for developing positive employee attitudes towards readiness for change. In addition, employees who receive encouragement and rewards for change are more likely to act willingly in support of organizational change goals contributing to overall organizational effectiveness (Organ, 1988; VanYperen et al., 1999). Therefore, financial job rewards, principally salary, may be more important for job satisfaction and have a more positive impact on employee readiness for change.

The second economic reward such as job promotion examines with employee job satisfaction. Internal employment promotion of employees relates on the basis of mutual benefit. In the conceptual framework it connects as an independent variable towards knowing the employees' attitudes towards job satisfaction and job satisfaction mediates between job promotion and readiness for change. The focus of this concept is that an employee who is desirous of internal job promotion may be more satisfied and retain with their job and if not can show intention to leave the organization (Shields and Ward, 2001). Many researchers apply this concept to understanding employee behaviors and finds positive, significant results (Chang, 1999; Poon, 2004; Shields and Ward, 2001). We find positive and significant relationship with job satisfaction and readiness for change. However, job promotion directly contributes to employee job satisfaction and indirectly to employee

readiness for organizational change. The results add support to previous studies and the statistical findings show that internal employment promotion is a positive source of developing employee job satisfaction (Clark and Oswald 1996; De Souza, 2002). Thus, the importance of internal promotion in the current fragile economic, financial and environmental situation may suggest developing policies, strategies or plans on the basis of economic reward factors such as salary and promotion.

Further, significant support for the relationship between intrinsic satisfaction factors and readiness for organizational change through mediating job satisfaction finds in this study. The results support previous studies (see Cook and Wall, 1980; Madsen et al., 2005; Mathews and Shepherd, 2002) in that employees intend to stay or at least show some organizational loyalty (emotional attachment) and organizational identification (feeling of pride) towards their institutions. The results of this study support the hypotheses that the perceived level of organizational loyalty and organizational identification influence employees' positive readiness for change with the mediation of job satisfaction. Moreover, this finding confirms and expands existing knowledge on organizations (Chang, 1999; Mullins, 1999). Thus, the evidence from this research study suggests that a thorough understanding of employee loyalty and identification requires attention in order to develop positive attitudes among employees towards readiness for organizational change.

In this research number of implications emerges from our model for example individual's emotions during change. The literature reveals that emotional reactions of employees to change can enhance the burden of management (Fox and Amichai-Hamburger, 2001). Researchers like Huy (2002) suggests paying attention to emotion that can contribute to successful change because it describes individual's energetic, optimistic, trust on their abilities and well organized plans dimensions. The findings of our research provoke implication with the relationship between economic reward and individual's intrinsic satisfaction factors to change readiness through job satisfaction. Other

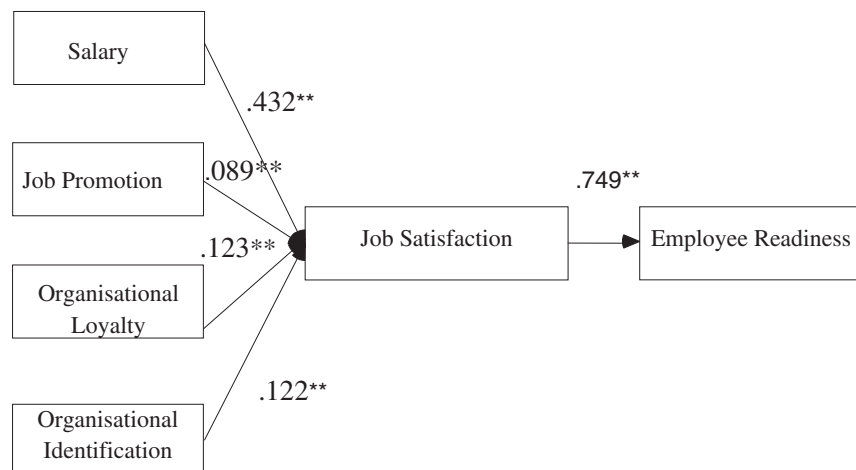


Fig. 3. Standardised parameters estimates obtained from the model.



implication of this research is to investigate the model with individual's personal characteristics. Information regarding individual's characteristics can be gathered from the web, visualizing texts and web mining techniques. Data and analytics talent must make a sense of understanding of employees' attitudes and behaviors. By analysing data of individuals, managers may understand their attitudes and behaviors. However, the dimensions of personality traits are linked to organizational change (Vokala et al., 2003). Thus, focusing on dispositional traits through big data analysis techniques like social media activities, managers or change agents may contribute significantly to the change readiness.

This research supports a further understanding of organizational change through individual attitude and behavioral change by focusing on the antecedent of economic rewards and external satisfaction factors. The data is largely transacted and stored in websites through usage of financial online activities. From the big data and its pedals become most ambitious for the managers to employ it in understanding employee's attitudes and behaviors. Thus, change readiness needed big data to assess the individuals. This comprehensive approach to individual readiness to change and its antecedents explore the link between the macro and micro levels of change.

### 3.5. Analysis and findings: big data and HR predictive analytics

As noted in the introduction of this paper, the authors contend that the adoption of big data strategies by organizations can be useful in order to create strategic insights which inform decision-making (Schroeck et al., 2012). Further, it is also suggested that big data may be able to impact upon an organization's strategy, people, and structure in a wider sense (Galbraith, 2014). Naturally given the definition of big data, the volume and size of large datasets and the ability to interrogate and analyse them through sophisticated means may lead to an associated increase in the ability many organizations to manage and deliver organizational objectives more effectively (Manyika et al., 2011).

The authors therefore now seek to combine, support and extend the empirical model findings with big data and predictive analytics elements – hence HR predictive analytics (HRPA) – that may then prove to be helpful to understand a wider set of impacting factors upon employee attitudes and behavior. This is achieved through considering the principal Big Data Pillars, Big Data Implementation Steps and Big Data Leadership Challenges to be addressed via big data in terms of organizational change efforts as below:

### 3.6. Big Data Pillars (5V's)

As noted previously, the application of big data techniques and principles is reliant upon five (or more) key components or pillars (Erevelles et al., 2016; Marr, 2015; McAfee and Brynjolfsson, 2012): understanding the amount and frequency of available data; the rapidity by which it is created; the level of granularity and richness of data; the quality and accuracy of data; and finally, identifying where and how it may be useful to the organization. In terms of the focus of this research these may translate to the so-called 5V's as follows:

- *Volume* – employee data based upon biodata (age, gender), length of service, revenue per employee, cost per employee, recruitment cost, staff development costs, promotion rates, absentee rates, compensation cost per employee, overtime and additional rates, health, wellbeing and sickness rates;
- *Velocity* – this may be based upon the timeliness and appropriateness of employee engagement points that each employee has with the organization. This may include but not limited to data as fundamental as availability and attendance rates through frequency of interactions with staff development and training opportunities; as well as individual performance management and mentoring opportunities;
- *Variety* – the richness of employee data that is available may well be

limited if kept solely within the organizational boundary (as shown for example in Table 1). However there may be an opportunity for managers to use big data analysis techniques to understand aspects of individual employee interactions and interests outside of the workplace. This may be through sentiment analysis of organizational communications (emails, reports, documents) all the way through to web-based / social media and online activity. However this does raise issues of privacy and confidentiality;

- *Veracity* – noting the above points in relation to Velocity and Variety of data, overall quality and accuracy is of importance. Hence Veracity can also be explained in terms of representativeness, data consistency, incompleteness, ambiguity and approximations. In the context of this research, this may relate to the underlying behaviors and attitudes of employees which may be reported truthfully, accurately or not at all. Within this, employee intentions as affected by extrinsic and intrinsic motivators would be most challenging to capture;
- *Value* – finally, the usefulness of employee-level data (internally as well as externally sourced) will need to be identified and made use of. This ultimately identifies the application of HR Predictive Analytics (HRPA) on the data gathered from the above preceding elements. This may include those volumetric metrics as identified previously and hence analysed in order to identify turnover rates, recruitment / candidate response strategies, predictive retention modelling, employee performance / risk modelling, and talent forecasting as identified by Mishra et al. (2016).

### 3.7. Big data implementation steps (SMART methodology)

Marr (2015) has defined a five step implementation approach for big data projects as follows:

- *Strategy* – Marr identifies several components of a big data strategy which for organizational change and employee engagement purposes will be less centred around customer and competition/risk and more likely to be centred around purpose (the context of the change that is required); finance (the related costs of change, recruitment, development and retention); operations (resource allocation, roles, responsibilities and core competencies to deliver on execution capability); resources (the required systems, infrastructure, processes and data to run business operations); people management, performance, retention and organizational culture; values, strategic mission, vision and leadership competencies).
- *Measure metrics and data* – as already discussed in previous sections the measurement and capture of employee and organizational data is fundamental to expanding and providing a wider holistic interpretation of reasons for employee engagement. For example in this research context, structured data may include that stored within core HR and finance systems; unstructured data may be that in relation to documents, images, videos, presentations and the like created by employees and within departments; internal data in addition to this might emanate from customers, suppliers, transactions and operational datasources; external data may be based upon customer/company/employee sentiment, social media conversations and activity, trends or demographic data; activity and conversation data would be that based upon employee communication internally and externally to the organization; and finally sensor data may be that as relating to embedded sensors in swipe cards, door and proximity sensors for access control, ambient temperature and location-based sensing devices.
- *Analyse your data* – As Rai et al. (2015) also note, the true benefits of using HR-based big data is the capability and capacity for the HR function to tap into and make use of captured data from a variety of sources whilst applying appropriate analytical techniques to identify patterns, or dynamic interactions within the data. Whilst it is possible to apply a range of statistical, machine learning and associated

techniques to the range of structured and unstructured data that is gathered (for example, via textual, sentiment, visual and even behavioral analytical methods) there are valid concerns about the extent to which analysis is applicable to such (human-based data). Angrave, Charlwood, Kirkpatrick, Lawrence and Stuart (2016) as well as Marr (2015) point out ethical and professional concerns relating to access, consent, confidentiality and appropriateness of HR predictive analysis (HRPA) noting that analysis outcomes may be limited by the needs of the HR function.

- *Reporting results* – In extension to the discussion around big data analytics above, providing context to HRPA findings will be dependent upon how results are reported to the wider organization (as well as management and indeed employees). Data visualisation as relating to organizational change therefore may involve approaches to relate and show not only structured data but also unstructured data through the usage of stakeholder maps, decision trees and cognitive/causal mappings of how individuals and groups behave and act in the organization (Irani et al., 2014; Sharif and Irani, 2006). Ensuring all employees can understand and have the necessary skills to make sense of reported big data results is therefore also a demand and request upon the HR function.
- *Transform the business* – This is possibly the most important element of putting big data applications into the organizational context. Again as Angrave, Charlwood, Kirkpatrick, Lawrence and Stuart (2016) point out, the utility of using big data analysis within organizations will stem from the ability of HR professionals as well as senior management in making relevant and conclusive connections between disparate types of data. There is subsequently a paucity of reported HR big data and analytics case studies which explain how a wide variety of data can be combined and transformed for real business benefit (outside of “simplistic” and routine optimisation of business processes). Organizations may need to consider transformation instead of change and seek data vectors which allow the exploration of intrinsic factors that lead to as improvements such as employee health and wellbeing; security, resilience and reliability within the organization; and the identification of new business opportunities based upon human capital.

### 3.8. Big data leadership challenges

Finally in considering how big data approaches may be used to support organizational change efforts, the authors note and identify relevant key leadership and management challenges as noted by McAfee and Brynjolfsson (2012), which are reframed as follows:

- *Management commitment (leadership)* – a vision and mandate as well as the ability to identify questions, themes, patterns and actions to enact big data-based strategic change is a core and unifying theme across the literature to date, as identified by Chen, Chiang and Storey (2012), Galbraith (2014), Manyika, Chui, Brown, Bughin, Dobbs, Roxburgh and Byers (2011) and Marr (2015). Inspiring and leading the organization to embrace a HRPA-driven philosophy for the benefit of individuals, teams and the wider firm will help to cement such approaches;
- *Analytics capability (talent management)* – organizations wishing to expand and deliver upon change strategies based upon big data and associated HR predictive analytics need to also consider the development of individual resources (data scientists, analysts, HR generalists, employee engagement specialists and data visualisation experts) as a collective initiative to transform and enable ongoing change. This requires skills development as well as awareness building in support of the organization having access to and using disparate data sources in (sometimes unconventional) ways;
- *Infrastructure design (technology)* – In addition, organizations need to have access to and provide investment for technology that will allow a multitude of data to be brought together across the 5V's

of big data (beyond the elements of the empirical model as shown in this paper for example). Although many of the technical requirements for big data and analytics are now open source and freely and widely available, there should not be an over-reliance upon the analytical infrastructure such that the technology becomes important and overrides the underlying strategic intent of the organization for its own sake. Rather the purpose of the infrastructure element here is to ensure that there is a tailored and designed approach to using the appropriate technologies so that the organization can make the most of the opportunity of bringing vast types of data together and analysing them appropriately (Finlay, 2014);

- *Network Intelligence (decision making)* – Given the nature of data available within and without the firm as discussed so far, the true benefits of using big data is suggested to be in terms of *as many employees* as possible being able to decipher and construct decisions about their own purpose, intent and that of the organization at the closest point to where the data is generated. This requires a greater reliance upon matrix or cross-functional cooperation – so that elements such as job satisfaction can be properly understood and addressed at the point at which employees report them;
- *Performance through knowledge (company culture)* – Finally, and as recognised widely post-the information age, knowledge transfer, organizational culture and working practices need to underpin the use and application of data towards becoming a data-driven company. As such, this element links directly through to management commitment and leadership requirements in the sense that individuals responsible for the organization or for organizational departments (such as HR) need to be aware of how big data and HRPA can be mis-interpreted (i.e. avoiding the “correlation for causation” trap in reading data patterns, as McAfee and Brynjolfsson note).

## 4. Conclusions

Organizational change in the context of a volatile, uncertain, complex and ambiguous global context is inevitable and likely (Abidi and Joshi, 2015). The manner by which organizations engage with their employees and stakeholders will then ultimately determine the extent and successful outcome of the change required. Critical to successful change is the level of attitudinal and behavioral engagement of employees in support of organizational change programmes. The authors have proposed that with the support of technological advances, vis-à-vis big data and HR Predictive Analytics (HRPA), there is an opportunity to increase the level of information, insight and value in order to help understand employees' attitudes and behaviors towards the organization (Ball, 2010). The research presented has therefore addressed recent calls for future research avenues in terms of employee readiness for change by combining both an empirical model for investigating employee attitudinal and behavioral factors; as well as a framework for expanding and putting these findings in a wider context using big data principles and strategies.

Firstly, the empirical findings suggest that employees become satisfied with their roles via sense of attachment factors such as salary and job promotion. Furthermore, employees' quality of relationship with organizational factors like organizational loyalty and organizational identification, are also supportive of change efforts. However, these empirical results indicate that salary and promotion benefits (i.e. extrinsic motivators) may lead to a greater initial attachment with the organization change process – but that longer term engagement with change efforts continue to be based upon attitudinal behaviors in terms of job satisfaction (i.e. intrinsic motivators). The identification of these determinants that underlie intrinsic and extrinsic factors may help change agents, managers and academic researchers to develop a greater understanding of change readiness process when dealing with organizational change and employee readiness. Such assessments of employees of an

organization should help managers to make targeted choices about planning, strategies and tactics that need to help foster employee enthusiasm for change.

However, as the authors note given the availability and accessibility of a range of data and information relating to employees in terms of big data, further insights that may explain and support employee engagement with organizational change may enhance decision-making and value of such initiatives long-term. The authors subsequently rehearse and identify a framework which combines three extant approaches to employing, implementing and embedding big data within organizations. Namely, focussing on Big Data Pillars (i.e. the 5V's of Volume, Velocity, Variety, Veracity and Value of data); Implementation Steps (i.e. a SMART approach to implementation of an analytics-based approach); and Leadership Challenges (i.e. considering the requisite organizational philosophies and commitments required to enable transformational change based upon big data principles).

As such, the authors propose that in order to effectively understand notions of employee readiness, behaviors, attitudes and motivators, there is an opportunity to carefully and skilfully include a wider set of datapoints beyond traditional, normative business and management research components identified in the literature. Hence supplanting and combining empirical data with additional unstructured, activity, conversation, audio-visual, social media, sentiment and even sensor-derived data in order to explore the deeper meaning of model elements covering change readiness, job satisfaction, salary and compensation, retention, performance, reward, promotion, loyalty and organizational brand identification.

In conclusion, the authors suggest that future research should seek to not only understand employee characteristics in relation to organizational change efforts in further detail (i.e. extrinsic and intrinsic motivators) but also seek to place these in terms of organizational and geographic cultural context; whilst also exploring and evaluating the risks, benefits and costs of an expanded insight into employee information via big data/HRPA analysis (for example the integration of data from non-organizational activities such as social media presence with existing organizational data). Additionally, the authors also suggest an on-going evaluation of appropriate research methods associated with the application of big data in the HRM context and how such interventions may help businesses in general (Erevelles et al., 2016), whilst also noting the need for a shift in focus from a wholly quantitative to a qualitative analysis of patterns within large, unstructured and diverse datasets (as identified by Lycett, 2013).

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