

Sensory technologies for improving employee experience and strengthening customer relationships

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Abstract

Emotions are always present when we talk about human interaction and relationships. In this chapter the focus is on studying the role of emotions in employee – customer interaction through theoretical discussion and two practical case examples. Particular focus is on modern sensory technologies, which can be used especially in measuring emotional states in such situations, where emotions are in other ways hard to express and identify. In this chapter, we argue that in the process of turning negative emotions to positive outcomes, the key is to understand the role that different relationships play in value co-creation. Manager-subordinate and employee-employee relationships have the most impact on well-being inside workplace, but especially for those employees that are involved in customer interface the customer interaction and relationship has a direct impact on job satisfaction. Naturally this applies also vice versa; job satisfaction has direct impact on the customer experience and satisfaction. Without measurement of emotional states of employees and customers it can be difficult to determine, which relationships and situations cause most stress and negative emotions in the workplace and within the customer interaction. Thus, emotions are in a key role in understanding and developing relationships.

Introduction

Employee satisfaction has been shown to be linked to business performance, company profitability (Harter et al. 2002) and through better customer service (Chi & Gursoy, 2009; Yee et al., 2008) to increased customer engagement and more loyal customer relationships (Berry & Carbone, 2007). The organization should be aware of the employees' emotions, thoughts and aspirations so that their dedication and commitment to work and to the organization can be strengthened (Naseem et al. 2011). Furthermore, it's been said that happy employees make happy customers. This phrase might already be a cliché, but it is nevertheless true, as the customer can clearly feel the effects. If a customer service rep, for example, gets off on the wrong foot, and the workplace atmosphere fails to support him in finding positivity, his customer will probably receive service that is inhospitable and strained. The customer will then go on with the day after the service feeling a little sad or confused, or a little irritated, or perhaps even furious. Emotions are therefore reflected and contagious, and the employee

in customer service work has a golden opportunity to make the customer's emotional state more positive than it was when the service situation arose.

Emotions are awoken especially in these kinds of social interactions within the service process. Thus, it is not surprising that e.g. in the latest servicescape studies the focus has shifted from the effect of the physical environment of the service process towards the social interaction between employees and customers, but also between different customers (Kraak & Holmqvist, 2016; Carù & Cova, 2015). Furthermore, the role of the emotions in building long lasting customer relationships has already been acknowledged for a long time (DeWitt et al. 2008).

Ultimately, the employee has quite big shoes to fill in the responsibility of what kind of customer experience the organization can create. It is no wonder, then, that particularly in the service sector, employee satisfaction has been shown to have a direct link to customer satisfaction, which in turn affects the results of the organization (Yee et al., 2008). Job satisfaction has been found to have a direct impact on customer satisfaction and an indirect impact on the financial performance of the organization (Chi & Gursoy, 2009; Naseem et al. 2011). Especially in services involving close interaction between the customer and the staff, job satisfaction has been found to have a significant impact on service quality and customer satisfaction as well as on the company's profitability (Yee et al., 2008). On the other hand, customer satisfaction also contributes to job satisfaction. Service professions continuously involve interactions with customers and successes or failures in these situations directly affect customer satisfaction and staff satisfaction. In the worst-case scenario, unsuccessful customer encounters can create vicious circles that can spread negative outcomes more widely to the organization's employees and customers (Groth & Grandey, 2012; Masuch, 1985). Job satisfaction not only affects work productivity but also the quality of work.

Job satisfaction and, in particular, well-being at work are broad concepts that consist of individual, job, organization and group, as well as factors relating to the managers and employee's superiors (Manka, Kaikkonen & Nuutinen 2007). However, well-being at work is said to be ultimately built on emotions and the person in the business operations is the only one that "feels" (Juuti & Salmi, 2014). As emotions play such a key role in well-being at work and in the employee experience, and through them in the customer's experience, and even in the success of the entire organization, it is appropriate to be closely familiarized with emotions. In this article, special attention is paid to technologies that have strongly developed in recent years for the measuring and reporting of emotional states. The focus of the review is on measurement of emotions using different technologies that 1) measure

human physiological functions directly, 2) measure emotions indirectly by analyzing human external behavior (e.g. facial expressions, speech) or 3) measure emotions subjectively by utilizing various applications that allow people to self-report their own emotions. Beyond this article, emotions can be measured also by making use of secondary emotional data that people themselves produce, for example, in the form of text or images in various information systems and networks, such as expressions of emotions in social media.

Following the introduction, this article discusses the concept of emotion and presents many ways of understanding emotions. This is followed by a review of the literature surrounding sensory technologies and emotion measurement. The review of the literature is not meant to be all-encompassing, but rather to create a picture of the commonly used sensory technologies and their measurement principles. After the review, practical examples of the application of sensory technologies in the development of the customer and employee experience in Finland are presented. Finally, the importance of emotions and the potential role of sensory technologies for developing job satisfaction and customer relationships is discussed.

The many forms of understanding emotions

Emotion, feeling, mood ... non-emotional affective qualities, emotional state ... primary emotion, secondary emotion, tertiary emotion ... superordinate level, basic level, subordinate level ... valence, arousal, activation, dominance, control, potency ... emotional circumplex, emotional wheel, emotion family ... basic emotions, categories, dimensions ... A beloved child has many names and a loving phenomenon is described, explained and attempted to be understood in many ways. Counting the number of definitions of emotion is hopeless and there is no answer to the question of the number of emotions (Scherer 2005, 707). However, as an umbrella concept, we may consider the affect (Bagozzi et al. 1999, 184; Kokkonen 2010, 14) and in everyday language we often talk only about “emotions” when we refer to different affective experiences. This article is not so much problematizing or examining what emotions are, per se, therefore as generally the everyday term “emotion” is used to refer to the different affective experiences here.

In the first place, the studying and understanding of emotions is challenging, because the concept is really very complex. The second challenge is how emotions can and should be measured; how and

where do emotions manifest and appear? Sometimes it is also worth considering are we studying emotions or the terms or expressions that describe them (see e.g. Tuovila 2005). If one measures a person's behavioral change or physiological reaction (e.g. facial expressions, change in the electrical conductivity of the skin, or heart rate interval), the result is not up to the person to remember or be able to describe. But, on the other hand, if we want to know what a person is subjectively feeling, it should be asked in one way or another (Feldmann Barret 2004, 281; Scherer 2005, 712). And while these descriptions of a person's self-reporting reflect what he or she feels, those emotions mentioned by the person cannot always be considered as separate emotions per se, as individuals use the same terms in different ways to describe their emotions. In addition, some are able to distinguish and describe their experiences very accurately, while others are only capable in more general terms (Feldmann Barret 2004, 267; Scherer 2005, 712). And even though, for example, the so-called basic emotions, such as joy, anger, sadness and fear, are often perceived as biological and universal (e.g. Kokkonen et al. 1996, 406), the culture also affects what these and other emotions bring forth, how they are interpreted and shown, as well as how they are discussed (e.g. Kokkonen 2010, 13-14; Tuovila 2005).

Roughly speaking, emotions can be conceptualized either as special, discrete emotions, or then usually with the help of two or three dimensions. Discrete emotions are often presented as different lists (like many lists of basic emotions) or hierarchies (Makkonen et al. 2019). For example, Laros & Steenkamp (2005) use 16 different basic emotion lists in their research to form a three-tier hierarchy, in which the in the superordinate level emotions are divided into positive and negative experiences, while the basic level has eight emotions (anger, fear, sadness, shame; contentment, happiness, love, pride) and the subordinate level up to 41 special emotions. A similar type of division can be found, for example, in an article from Shaver et al. (1987) about prototypical emotions and hierarchies.

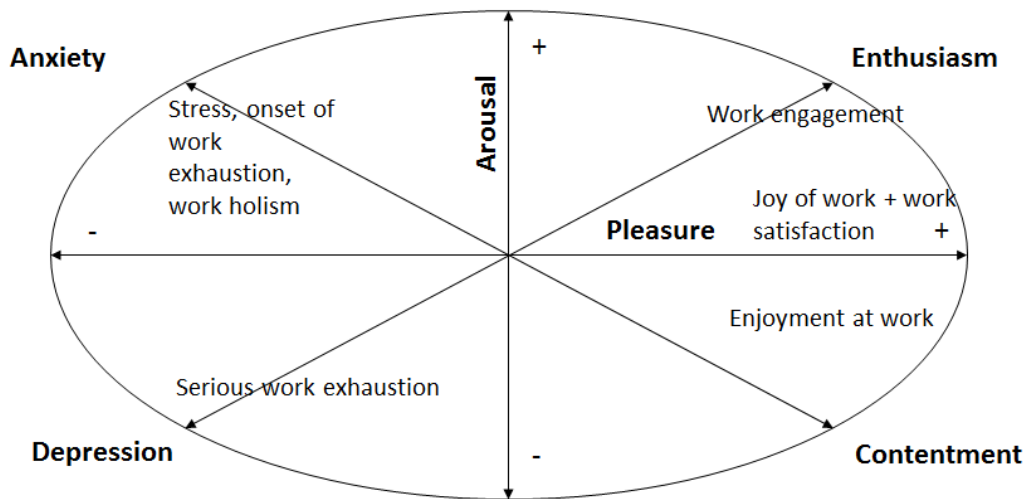
In dimensional terms, two-dimensional examinations generally give birth to a variety of four- or multi-fields or emotion circles and wheels. Usually the dimensions are pleasure / valence and arousal (e.g. Seo et al. 2008) or valence and control (e.g. Scherer et al. 2013). Dimensions and their number are not unanimous and, among others, Mehrabian et al. (1997) use three dimensions (pleasure, arousal, dominance) to define "emotional space". In a dimension-based presentation, emotions can be conveniently captured with a limited number of dimensions. On the other hand, the dimensions are rather abstract and the language used does not always correspond with how people would describe the experiences in their normal way of speaking (Sacharin et al. 2012, 4). A discrete way of presenting provides more accurate information than mere dimensions, as specific terms describing emotions and

the categorical or hierarchical relationships between them can also be taken into account. As a hybrid case, we can use the example of Jussila et al. (2018), in which specific emotion terms are combined with the three dimensions (pleasure, arousal, dominance) resulting in eight emotion families.

Thus, there are many challenges in understanding emotions and studies, as well as discussion, about the essence and measurement of emotions are continuous. In any case, it is important to know the basics, possibilities, and constraints of each perspective and way of measuring so that one can correctly interpret the results.

Satisfied and engaged employees can create positive emotions in customer

Well-being at work can be described as affective / emotional-dimensional, relatively (Figure 1). According to the model of affective well-being at work (Warr, 1990), the central dimensions of well-being at work are pleasure and arousal, to which additionally other dimensions of well-being at work are anxiety / contentment as well as depression / enthusiasm. The pattern is elliptical in shape, because pleasure has been found to have greater weighting than arousal. The pleasure dimension is seen to be particularly relevant to job satisfaction.

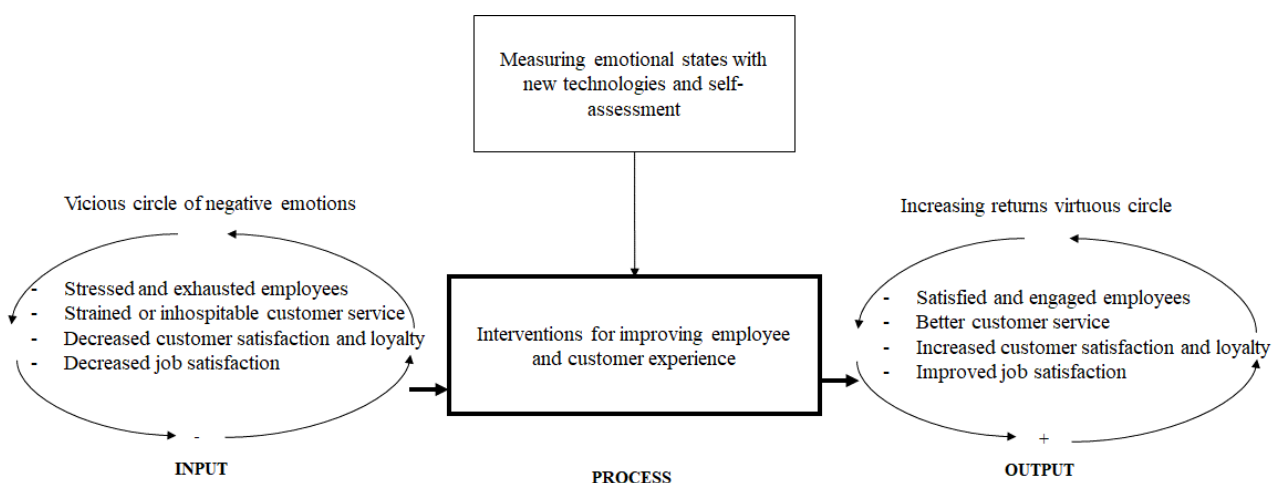


Picture 1. Dimensions of well-being at Work (Hakanen 2004; applied from Warr, 1990)

As can be seen from the picture, work fatigue has a minimal association with arousal and pleasure. Low pleasure but high arousal characterizes stress, the developing of work fatigue and, for example, workaholism, which better describes the work attitude and way of doing things rather than well-being. Relaxation and enjoyment at work include pleasure but little arousal. Work satisfaction can be thought

to belong to the right side in the area of the pleasure axis and just above that is the joy of work. (Hakanen, 2004)

Lately there has been a lot of talk about the engagement of work as a desired state. This work engagement refers to a positive emotional state, characterized by the terms “energy”, “dedication”, and “immersion”. Unlike flow, engagement is not a momentary peak experience, but a more permanent, widespread state that is not confined to a particular situation or task. In everyday life, the engagement of work is reflected in the employee's willingness to go to work, to make the work meaningful and enjoy it, to be proud of the work and to persevere in it when faced with adversity. An engaged worker is a producer and an achiever. The engaged work is located at the top right of the picture, and describes positive, pleasure-filled excitement and enthusiasm. It should be noted that the engagement of work does not mean that the work has a 'pulling' property, but rather a genuinely positive state of well-being. To experience work that is engaging is important because of the positive satisfaction it produces. Work is also important for workaholics, but they don't enjoy it. (Hakanen, 2009). Thus, there are differences in the emotional state of the engaged worker and of the workaholic, and it is important to recognize the differences in these emotional states in order to support well-being at work. Measuring emotional states with new technologies and self-assessment methods can help take steps forward on the complicated path of well-being at work. Moreover, measuring emotional states is the first step that can help companies understand both employee and customer experience and develop means to break the vicious circle of negative emotions and steer towards an increasing returns virtuous circle. Based on systems theory approach (Senge, 1991; Garud & Kumaraswamy, 2005) the role of emotion measurement can be illustrated to impact the process of turning negative emotions and in the one extreme vicious circle of negative emotions towards positive outcomes and ideally an increasing returns virtuous cycle.



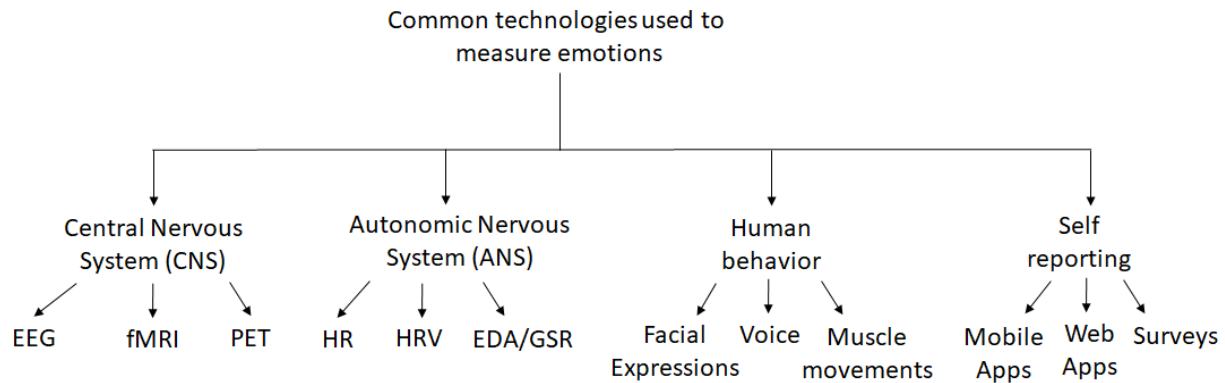
Picture 2. Proposed process of turning negative emotions to positive outcomes.

In the process of turning negative emotions to positive outcomes, the key is to understand the role that different relationships play in value co-creation. Manager-subordinate and employee-employee relationships have the most impact on well-being inside workplace, but especially for those employees that are involved in customer interface the customer relationship has a direct impact on job satisfaction. Without measurement of emotional states of employees and customers it can be difficult to determine, which relationships and situations cause most stress and negative emotions at the workplace.

Sensory technologies and measurement of emotions

There are many types of emotion technologies. Roughly, sensory technologies can be divided into two categories: laboratory-level sensory technologies and field-level sensory technologies. Laboratory-level sensory technologies are scientifically validated measuring instruments that perform measurements in laboratories. The upside of laboratory-level emotion technologies is their accuracy, but the downside is their inadequacy for measurements under authentic conditions in which employees do their work. As an example of this, we can mention electroencephalography (EEG), in which loose electrodes or an electrode cap (Martikainen and Mäkinen 2018) are placed on the head being studied, and with which the movement and the performance of typical work tasks are thereby very limited. Also, appearance reasons may exclude the use of laboratory-level emotion technologies, for example in customer service. Field-level emotion technologies can be used in the field as their name suggests, allowing measurements under authentic conditions and, as a rule, do not interfere with ability to perform work. Examples of such technologies include various smart bracelets and smart watches (Picard 2017) as well as smart rings (Jussila et al. 2018). There are, of course, situations and working conditions that are also unsuitable for field-level sensory technologies. For example, in the manufacture and handling of food, rings, jewelry and watches can pose a food hygiene risk and must be taken out during the work shift. In general, however, field-level emotion technologies are more convenient to use and typically do not require specific work arrangements or actions from the user side. The disadvantage of the field-level emotion technologies is their lower accuracy. Some of the field-level emotional technologies are so inaccurate that they are not suitable for scientific research at all, but rather produce mainly indicative information about the phenomena being measured.

More subtle emotion technologies can be divided according to the measurement method (e.g. Mauss and Robinson 2009). More generally, emotions are measured based on central nervous system (CNS), autonomic nervous system (ANS), human behavior or self-reporting (Figure 3).



Picture 3. The most common technologies used to measure emotions

In the market, there are several emotion technologies based on wearable electronics which can measure the emotions from physiological signals. The most common ways to measure the physiological responses of emotions are measured through the skin conductance response (electrodermal activity, EDA, or galvanic skin response, GSR) and the measurement of blood circulation (Maus and Robinson 2009), which provide information on the functioning of the autonomic nervous system (Martikainen and Mäkinen 2018). Blood circulation is measured by electrocardiography (Martikainen and Mäkinen 2018), which is represented by, among other things, heart rate (HR) and heart rate variability (HRV) measurements (Maus et al. 2009). Based on a meta-analysis (Cacioppo et al. 2000), a single autonomous nervous system activity indicator (EDA, HR, HRV) can mainly be used to obtain information about arousal level instead of a single discrete emotion *feeling*. On the other hand, there are also studies (Stemmler, 2004; Kreibig et al. 2007; Cacioppo et al. 2000), which have found that it is possible to obtain more detailed results by combining several indicators of autonomic nervous system activity and can separate, for example, discrete emotions of sadness and fear with a measurable 85% accuracy (Kreibig et al. 2007).

Laboratory-level emotion technologies that can measure the emotions of autonomic nervous system activity, especially arousal, include the Shimmer GSR (Galvanic skin response) measuring instrument (Burns et al. 2010) and the BIOPAC Systems ECG (Electrocardiogram) electrodes (Wei et al. 2018). Examples of field-level emotion technologies that can be used to measure autonomic nervous system activity are the Moodmetric smart ring (Torniainen et al. 2015), which measures the skin conductance

response, Firstbeat (Parak and Korhonen 2013) measuring heart rate variability and the CardioMood (Okkonen et al. 2017) Android application to measure and analyze heart rate variability with the help of various sensors.

Practical example 1: Sensory technology in developing the customer and worker experience

In May 2018, Rinnekoti and Sailer Research and Development Ltd launched a pilot study which combined the digital measurement of emotion and stress levels into videographic qualitative research. The goal of the research was to better understand the customer's emotions and, through this, create a better customer understanding. With the help of the study, the desire was to improve both the quality of life of customers and the well-being of the staff.

The study combined a new way of videographic research and technology: The emotion and stress states of Rinnekoti's instructors and clients who participated in the study were followed with the help of a Moodmetric ring. By combining ring information with staff journal entries and video material, one obtained information and understanding of customers who were otherwise unable to express emotions due to illness or disability. By monitoring emotions and stress conditions, customers were able to get their voices heard and thus affect everyday issues. The follow-up also provided assurance on such issues for which the importance or agreeability to customers had previously been based on what it "just feels like". One of Rinnekoti's instructors explains: "I feel that with the help of the ring, I can read a lot more about the customer." The expressions, gestures, and sounds tell a lot, but with it, you get confirmation of what you feel and what you want to do."

The second part of the study focused on measuring the recovery and stress levels of nursing staff at work and during leisure time. Through the use of sensory technology, employees learn more about themselves, stressful situations and recovery. For those who work in guidance and nursing, the recovery during sleep was very much based on the individual. A particularly busy working day, for example, could correspond that night with a restless sleep.

Emotion measurement provided meaningful information from the point of view of well-being at work; for example, the stress levels were not necessarily as high as the worker had thought, and the recovery from work was quite fast. For some people, the measurement strengthened the view that work and home affairs remain separate, and therefore the work matters were not stressing at home or vice versa. The results can be used to improve well-being at work and in the work organization. The

customer's right to self-determination is emphasized in Rinnekoti's operations. Increasing knowledge of the customers will help employees work according to their customers' wishes, and thus work according to the employee's and the organization's goals, which contributes to coping with work. One employee gave this view of the benefits of the research toward their own work: "It feels more demanding in the communication at work. I would like to know what the customer thinks about certain matters. The communication could become smoother. The research makes it easy to get more information about customers, which we may not have otherwise detected or noticed."

The research results are used at Rinnekoti as part of the development of the workplace well-being and in the customer work. The results of the clients participating in the research are valuable because there was an increase in the information about their individual needs. The results also help supervisors to also learn to pay attention to how well the timing of the assistance and guidance situations suits the individual needs of the customers. For example, at meal times it has been possible to make customer-focused concrete changes to make them more appealing for the customer.

The research also highlighted the need for staff to have a sufficient grip on methods for augmentative and alternative communication, and because of this, training has increased for the staff. A large number of different technological aids were provided for the use by the units' staff and customers to support communication and to enhance pleasant multisensory sensory experiences.

The study found that the noise level of some facilities affected both customers and employees. New solutions were sought for the acoustics in the facilities and acquired were, among others, hearing protectors to reduce the noise levels.

The results of the research will also be utilized as part of the development of other facets in personnel well-being. "Good workday!" and "Safe workday!" promotions are taking place at Rinnekoti to further facilitate employee well-being. According to research results, the ability to recover during sleep is a very individual matter. After the research, staff members were offered the opportunity to receive online training for a well-being service in which they were given, among others, instructions and exercises for recovery. A healthy pillow was given by the employer as a Christmas present as a continuation of the well-being theme. At the same time, emotion research took place with a number of other development measures. As a combined effect of all these development activities, the sick leave of Rinnekoti's personnel decreased from 2017 to 2018 by a total of 15 percent.

- Hannu Uotila, CEO, Sailer Research & Development Ltd

Sensory technologies, which measure the functioning of the central nervous system, more generally the brain function, are basically laboratory-level devices. Emotional physiological responses can be measured from the brain, for example by electroencephalography (EEG), and by neuro imaging (Mauss and Robinson 2009). EEG measurements illustrate where brain activation occurs approximately with different emotions (Mauss and Robinson 2009; Martikainen and Mäkinen 2018). For example, the emotion of anger is connected to greater activation on the anterior part of the left side of the brain (Harmon-Jones and Allen 1998) and the sense of anxiety with activation of the frontal lobe of the left side (Heller et al., 2002). Neurographic imaging methods, as well as functional magnetic resonance imaging (fMRI) and positron emission tomography (PET), can be used to identify more precisely which brain areas are active in certain emotions as compared to electroencephalogram measurements (Mauss and Robinson 2009; Martikainen and Mäkinen 2018). For example, it has been found that there is a connection between fear and activation of the amygdala. Recently, consumer-oriented EEG devices have also been developed, such as Emotiv's and Muse's brain helmets (e.g. López-Gil et al. 2016), which can also be used, with certain reservations, in field conditions (e.g. indoors or outside in good weather conditions).

Emotions can also be measured by human behavior. Bodily expressions, such as facial expressions and muscle movements, tell about people's emotional experiences (Martikainen and Mäkinen 2018). Facial expressions can be measured by, for example, electromyograph (EMG). Electromyographs measure the electrical potential of the muscles attached to the face, the most common of which are the measurement of the corrugator supercilii associated with the eyebrows and the zygomatic muscle associated with the raising of the corner of the mouth (Martikainen and Mäkinen 2018). Electromyography is suitable for measuring emotions with respect to the pleasure dimension, whereby the activity of the muscles associated with the elevation of the corners of the mouth increases as the pleasure increases, and the activity of the muscles associated with the eyebrows decreases as the pleasure grows (Cacioppo et al. 2000). To recognize emotions from facial expressions, machine-based vision applications have also been built in which an external device, such as a cell phone camera or camcorder, depicts an object and tries to identify the person's emotion from the image using an algorithm. An example of a machine-based vision application is a mobile application available for Android devices that can recognize six different basic emotional states in real time from video images

of people with 86% accuracy (Suk and Prahakaran 2014), Emotient technology capable of simultaneously recognizing multi-person emotion from video (Movellan et al. 2014; Winkler et al. 2016) and a method for identifying micro-expressions (Li et al. 2018) which can be used to identify emotions that a person did not mean to display from a video image.

As part of human use, emotions can also be measured in terms of arousal dimension by measuring the use of voice. Speeches have shown that, for example, during elevated emotions, such as fear and anger, the human pitch is higher than those of lesser-elevated emotions, such as grief (Martikainen and Mäkinen 2018); Feidakis et al. 2011), also tempo and rhythm, intonation, vibration, key change, and volume have been reported to signal emotional changes (Feidakis et al. 2011). For example, using the Moodies mobile application it is possible to record sound, and based on a 20-second sample, the application reports a discrete emotion recognized by the algorithm (Marchi et al. 2016).

In addition to the above-mentioned objective emotion sensors, various self-reporting applications have been developed to enable individuals to report their own emotions. These include, for example, various surveys, web applications, and mobile applications. Commonly used surveys to identify employee experience with stress, workload and well-being at work include: Labor Stress Questionnaire (Elo et al. 1990), Better Work Community ParTy Survey (Multanen et al. 2004), and Maslach's general work fatigue evaluation method MBI-GS (Kalimo et al 2006). Web applications that can be used to self-report emotions include Emotion Tracker, an application for discrete emotional reporting (Kuivanen 2017), the NayDaya web application for storing emotions generated by digital objects (Järvinen 2018), the Vibemetrics emotion-meter (Pitkänen 2018) and a VibeVision tool for measuring customer, personnel and event experience.

Practical example 2: Emotions at the heart of measuring the employee experience

VibeVision® is a tool for measuring and analyzing emotional experience developed in a university collaboration. The tool is used either as a continuous measure of employee experience or as individual measurement periods, such as, for example, during periods of change. The meter is based on the PAD framework (Mehrabian et al., 1997), according to which emotions can be described by three dimensions - Pleasure, Arousal, and Dominance. The meter therefore takes into account the range of emotions broader than the traditional positive-negative way of thinking. For example, embarrassment and irritability guide us to behave as employees or customers in very different ways, although both emotions are seen as negative.

The most effective way to measure emotional experience and, above all, the reasons behind emotional experience, is to ask about it from the staff or from the customers themselves. The aim of VibeVision® is not to study a person's deepest emotion, but rather the strongest emotions that come from a certain experience and the reasons for those, as well as a few questions related to the business.

In this way, we learn to understand our experience deeper than before and develop our experience in a business-oriented and goal-oriented way. We can also set aims for our emotions. The goal may be, for example, that under a change in strategy, less than 5% of the employees feel fear, or even that the working weeks would start with 80% of the staff in an enthusiastic state of mind.

VibeVision® provides deeper insight into the customer experience, but also more common business metrics such as NPS, Customer Effort Score, or grouping questions. On the staff side, one can monitor employee load and recovery, the meaningfulness of work tasks, attitudes to change, or the impact of training programs on the staff's emotions. At the same time, you will also learn about the influence of emotions on these factors - which emotions predict successful customer meetings or which emotions correlate with a high overtime workload.

Making the results and emotional atmosphere visible is essential. It is important to point out why an organization has a certain emotional atmosphere and what can be done for this or done at its best. The every Monday morning irritation is not always related to work or the organization. Irritation can be caused by very simple things, such as constant traffic or stress can cause very personal issues. However, these things, which are independent of the work, affect our work performance, and therefore the identification of these issues is also important. Is it possible to make it easier for staff in the Monday morning traffic to stagger the work time flexibility or by the work organization giving more support for employees to handle personal life situations? To simplify, by measuring, one also learns what negative emotions stem from - a poor leadership culture or a constantly temperamental copy machine.

Identifying emotions as part of the experience, whether it be employee or customer experience, gives a business not only a competitive advantage, but also helps to identify the risks hidden in the experience. Only through consciousness of emotions can experiences lead to genuine leadership and development of customer relationships.

Mobile applications for reporting emotions include: Emotion Gauge (Anderson et al. 2017) for the reporting of emotional states with respect to the dimensions of pleasure, arousal and dominance, the Moodmetric App (Jussila et al. 2018) in which the value of the arousal dimension is based on the measurement of the electrical conductivity of the skin and to which the person can complete his assessment in the pleasure dimension and more accurately record the emotional experience as a journal entry, as well as the Emotion App (Jussila et al. 2018) Android application, which allows the user to report the emotion by selecting one of the eight emotional senses according to the emotion family and by giving a free-form explanation.

Conclusion

Sensory technologies have brought new possibilities for developing both the employee and customer experience, as they provide means to react to affections and in turn, strengthen emotional linkages and the customer relationship. Sensory technologies, for example, are the only way to identify the emotions of those who cannot express them. In this way, we get better information than the “just feels like” descriptions to find out how people experience different situations, such as what things are felt as comfortable and uncomfortable. Rinnekoti’s practical example illustrates how **increasing customer knowledge helps employees work according to their customers' wishes, and so act according to the employee's and the organization's goals**, which contributes to coping well at work. As also shown in the VibeVision practical example, **only by knowing emotions can experience lead genuinely toward leadership and development of customer relationships.**

Objective information on employee experiences through sensory technologies can be used to complement subjective experiences and views on working conditions and well-being at work. For example, studies of well-being at work have shown contradictory results between experienced and objectively measured stress (Oldehinkel et al. 2010). For example, some people underestimate their workload and overestimate their own coping, which in a long-term workload situation may lead to work fatigue and prolonged loss of work capacity. **In addition to making use of well-being surveys and subjective experiences described by the employee, objective sensors could recognize such situations in time and react before negative consequences happen to the person and the organization.**

Emotions have a different meaning depending on the value system of the organization and its management. For example, in the industrial value system which emphasizes efficiency and performance, the importance of emotions may also be neglected, and an effort is made to squeeze out as many resources as possible from the workers. However, the loss of employee and customer emotions can lead to significant problems and business consequences. On the other hand, it is also recognized in the industry's value system that value cannot be obtained or captured if the employees are unproductive, ineffective or without motivation (Boltaski and Thévenot 2006). In organizations that, in turn, incorporate a value system based on reputation building and maintenance, emotions are seen to play a more central role - and it is understood that reputation and trust can also be easily lost if they do not appreciate the emotions and opinions of their own employees and customers. Furthermore, in the process of turning negative emotions to positive outcomes, the key is to understand the role that different relationships play in value co-creation. Manager-subordinate and employee-employee relationships have the most impact on well-being inside workplace, but especially for those employees that are involved in customer interface the customer relationship has a direct impact on job satisfaction. Naturally this applies also vice versa; the job satisfaction has direct impact on the customer experience and satisfaction. Without measurement of emotional states of employees and customers it can be difficult to determine, which relationships and situations cause most stress and negative emotions in the workplace and within the customer interaction. However, in terms of measuring emotions, it is good to realize that, in addition to technologies, it is important for organizations to evaluate and discuss their own value system and their most precious stakeholder relationships that should be nurtured. There is definitely demand for research that links emotions and relationships, and applies both the soft side of social science research and modern sensory technologies for the best of both employee and customer experience development.

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