

Human Resource Management-relevant Virtual Community Research: Review and Outlook

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***Abstract.** Virtual Community (VC) is a comprehensive phenomenon with relevance to social as well as economic transactions. Also Human Resource Management (HRM) includes both relationship- and value added-oriented processes. HRM-actors, in particular HR-managers and employees, increasingly try to balance their personal and job-related needs. Thus, given increasingly spatially dispersed workplaces, the usage of VC may generate benefits or risks for HRM-relevant processes. Further, applicants utilize VC to enhance their chances in the recruitment process. Yet, although there is practical evidence of HRM-relevant VC (VC_{HR}), respective research literature seems to be scarce. To explore this, the paper aims at assembling and evaluating relevant academic literature to give an impulse for systematic VC_{HR} -research which might abet to the development of a respective research area in the context of e-HRM.*

Keywords: virtual applicant community, virtual employee community, virtual HR-community, rigor vs. relevance, e-HRM.

1 Introduction

Virtual Communities (VC) are defined as community-oriented, web-based discussions of groups of people with a certain kind of common interest and a certain degree of social belonging [53, 105]. The context in which VC are set is rather broad. Given comprehensive accessibility and habitual usage of information and communication technologies (ICT), VC represent a common and widespread phenomenon and are used in personal as well as organizational scenarios. Virtual discussions develop in regard to gaming (e.g. fun and fantasy), personal interests (e.g. demographic groups, health, hobbies), and economic transactions (e.g. discussions on brands, products, purchases) [for a common categorization see e.g. 6]. Social aspects, which go along with the idea of community, are to be considered in business communication because employees and managers though they act within business scenarios cannot fully prescind from their personal needs. Also, increasing network-oriented organizational forms and virtual workplaces demand to reflect social aspects of the work relationships denominated as 'communities of work' [109]. Due to their potential socio-economic value VC enhance formal as well as informal communication and thus are able to meet personal and organizational requirements simultaneously. Thus, multifarious motives and benefits are to consider in regard to participation as well as usage and management of VC.

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VC exist in the scope of extra-organizational communication enabling communication with customers, administration/government, businesses, or applicants (B2C, B2G, B2B, B2A), and also in intra-organizational communication enabling communication between internal actors on hierarchical- or peer-levels (B2E, E2E). As already studied in other business scenarios (e-commerce), VC may also affect external and internal HRM-relevant relationships in regard to personnel marketing, training and development, and leadership [35], and are means to foster virtual information exchange and social support in the increasingly dispersed and thus also virtual workplace [128]. Formal, usually task-oriented virtual communication yields the potential to enhance HRM-processes whereas informal, socially-oriented virtual communication (virtual water cooler talk) impact motivation and commitment. Also negative implications need to be considered as personal networks and information exchange increase beyond the sphere of influence of HR-executives.

HRM-relevant VC-research should be a subset within the research on e-HRM research [85, 114], which is defined as “[...] the (planning, implementation and) application of information technology for both networking and supporting at least two individual or collective actors in their shared performing of HR activities.” [114: 20]. With reference to this concept, the web-based nature is obvious and actors are easily identified. Yet, although a basic HRM-relevance is assumed further exploration of application and effects is necessary. The aim of this paper is then to enhance research in this area. First, an initial literature review is presented and discussed. Subsequently, an outlook is given to propose relevant research perspectives, a definition to delineate the term VC_{HR} , a typology, as well as theories and methods for further exploration of the VC_{HR} -phenomenon. The paper concludes with a call for future research.

2 Literature Review

VC contributions are extensively heterogeneous. To review the amplitude of contributions which strongly differ in quality, perspective, and context is an unfeasible undertaking. Only few papers give rough sketches [53, 83]. VC-research dates back to 1968 when Licklider & Taylor [84] expressed their vision of ‘on-line interactive communities’. Following the initiation of a computer network basically for research purposes, further options for virtual (later also web-based) social communications [e.g. 105], conceptual and technological design [e.g. 76, 101], and new business models [e.g. 55] are opened up.

The aim of the literature review is to provide an overview of VC-contribution with relevance to (e-)HRM. Due to the chosen review method which has a narrow VC-focus based on the assumed importance of reciprocal communication applications and looking for HRM-relevance in VC-literature rather than on evaluating topical web-based HRM-concepts, the results cannot be exhaustive; yet should definitely lead to confirm and explore or challenge the VC-relevance for HRM.

2.1 Method

An iterative research approach is chosen which comprises a period of fifteen years (1995-2010) since the mid 1990s mark essential developments with respect to technology and VC, i.e. the facilitation of the World Wide Web (WWW) and the design of VC for economic purposes.

Step 1: A primary review is based on an EBSCOhost Business Source Premier (BSP) database search. A combination of the general search terms ‘virtual community’ +

‘human resource’ (boolean research mode) applied on titles or abstracts of peer-reviewed academic journals found only one article [37]. As a crosscheck, the screening of A-ranked journals (Human Resource Management/HRM, Human Resource Management Journal/HRMJ, International Journal of Human Resource Management/IJHRM, Journal of Human Resources/JHR according to WU-Journal Rating 2009) only revealed a second contribution [118].

Step 2: Hence, the BSP database review must lean on an extended sample. Keyword combinations (boolean research mode) applied on title or abstract of peer-reviewed academic journals now include specified communication applications (forum/discussion board, weblog, chat/instant messaging/virtual world) instead of the general VC-term, HR-actors (employee, HR-executive, applicant), as well as functional areas (recruitment, development+HR, leadership+HR) and other keywords which imply HR-relevance (knowledge+HR, collaboration+HR, leadership+HR, participation+HR, trust+HR, career). Additionally, the term Virtual Workplace is searched due to the impact of changes in work organization on communication structures. Still, a selection is difficult because a) systematic research in the research field of each HRM-function is beyond the scope of an initial review, b) found HRM key terms (e.g. development) often refer to VC-design instead of HR processes, and c) a selection from other VC-research areas also would reveal differentiation problems due to the large number of contributions. Although this research step could generate ninety-nine hits, only seven thereof are considered to be relevant [1, 3, 25, 37, 42, 110, 121].

Step 3: Step 2 shows that either the amount of academic literature on the topic is inherently rather small or the chosen approach significantly constricts the results. Thus, the preceding approach is complemented by free Internet research (Google Scholar, snowball technique), including academic journals and conference proceedings and with reference to the above mentioned keywords. While hereby further thirteen articles are revealed [5, 15, 19, 23, 40, 74, 80, 95, 98, 102, 113, 115, 124] it is detrimental that the results are not reproducible.

Step 4: In order to better understand the identified contributions, they should be contextually discussed. For that, the fourth step includes free research on contextual contributions.

2.2 General Results

In contrary to the amplitude of general VC literature, literature on HR-specific VC is scarce and no discrete e-HRM sub-discipline can be stated. The selection of twentyone articles listed in **figure 1** comprises a basis for future research, yet is subject to discussion in regard to the degree of differentiation from related areas (e.g. work organizational, knowledge management (KM)) as well as it cannot be exhaustive in regard to applied research method and an unidentified number of practical or semi-academic contributions.

Within the proposed selection eighteen contributions are published in academic journals [1, 3, 5, 15, 19, 23, 25, 37, 42, 74, 95, 98, 102, 110, 115, 118, 121, 124] and three stem from conference proceedings [40, 80, 113]. The inclusion of proceedings should have increased the results as meanwhile large international conferences (e.g. International Conference on Communities and Technologies/C&T, Hawaii International Conference on System Sciences/HICSS, Americas Conference on Information Systems/AMCIS) offer particular (mini-)tracks on VC. The comparably small number however is explicable as those tracks mostly focus on social aspects, marketing/e-commerce

perspective, success, and design. Explicit HRM-relevant aspects however are neglected. The regional dispersion based on authors' affiliations shows a majority of articles with American origin (N=12), followed by Europe (N=7) and Asia-Pacific (N=3)¹⁰. In regard to chronology, the number of contributions increased over time. Fifty percent are found in the most current period (2007-2010).

Author	Explanation aim	Theory	Method	Implications
Akkirman/ Harris 2004 (j) USA	Employee satisfaction in the Virtual Workplace	N/A	Case study (N=86) Correlation and variance analysis (ANOVA)	P: satisfaction and success of Virtual Workplace depend on strategies and activities R: cultural aspects, effects of implementation, development of company's performance
Anderson 1999 (j) USA	Model of HRD-relevant Internet applications	N/A	Conceptual	P: improvement of HRD by learnercentric and interactive Internet-based activities R: learner and instructor types, effects on HRD organization
Ardichvili 2008 (j) USA	Success factors of vCoPs as collective learning measures in the workplace	N/A	Conceptual	P: consider framework to encourage participation and remove barriers R: explore vCoP in context of activity theory and situated cognition theory
Birchall/ Giambona 2007 (j) UK	Company-external Virtual Learning Communities for SME managers	N/A	Conceptual	P: VC are a feasible learning tool in regard to temporal, financial, and spatial restrictions R: trust level and development
Bock et al. 2008 (j) Singapore	Impact of VC leadership on motivation and organizational commitment	OSU leadership theory	Study (N=92) PLS	P: VC management should consider leadership styles R: explore leadership in blended communities, other influencing factors, and outcomes
Cho et al. 2005 (j) Korea	Impact of IM on occupational relationships	N/A	Study (N=137) Interviews (N=13) Social network analysis	P: general usefulness of IM to support occupational relationships R: explore hierarchical and cultural aspects
Cortini 2009 (j) Italy	Challenges, options and risks of weblogs in the context of	related to CSP-Framework	Conceptual	P: reflection of blogging policies R: perception of blogging

¹⁰ Note: Parker et al (2004) is counted twice as it is of American and Asia-Pacific origin.

	Corporate Social Performance (CSP)			policies and company's attitudes towards blogging by employees, impact on commitment
Ebner et al. 2009 (j) Germany	VC-concept of company-external suggestion management system	N/A	Case study Action Research	P: relevance for R&D and HR-processes, incentives for participation and stakeholder's participation in development R: conditions, structures, consequences, further application scenarios
Ettinger et al. 2008 (p) Netherlands/ Germany/ Austria	Participation factors in career communities	N/A	Case study (N=1) Interviews (N=6) Ethnography	P: relationship-oriented design suggestions for recruitment platforms R: N/A
Fairbank et al. 2003 (j) USA	Interactive forum as part of Employee Suggestion Management Systems (ESMS)	expectancy theory	Conceptual	P: replacement of traditional suggestion management systems R: pilot implementation and evaluation
Kahai et al. 2007 (j) USA	Team Collaboration in VW	N/A	Conceptual	P: impetus for design suggestions R: impetus for research
Laumer et al. 2008 (p) Germany	Recruiting in VW	N/A	Study (N=9.679) Descriptive statistics Case study (N=1)	P: recommendation to consider VC/VW in recruiting strategies R: explore country-specific VW-usage patterns
Parker et al. 2004 (j) New Zealand/ USA	Concept of career communities	N/A	Case study (N=3) Q-methodology (ICCS)	P: N/A R: explore further aspects (identity, career success, career support) and concepts (extra-organizational relationships)
Pliskin/Romm 1997 (j) Israel	VC evolution during a strike	N/A	Case study (N=1) Content analysis	P: N/A R: explore intra-/interorganizational ICT usage, cultural factors, ethical dilemmas
Quan-Haase et al. 2005 (j) Canada	IM for Collaboration	N/A	Study (N=27) Interviews (N=10) Text analysis (Nvivo)	P: consider visibility tools in VC design R: extend social translucence of technology (STT) framework
Shaw et al. 2007 (j) USA	Impact of IM on organizational communication	N/A	Explorative study (N=78) Logfile	P: additional to traditional communication channels, increased presence

			analysis, Deskriptive statistics	awareness, thus more effective communication and increased productivity R: restraints on productivity by IM usage
Stocker/ Tochtermann 2008 (p) Austria	Weblog usage in SMEs	N/A	Case study (N=1) Deskriptive statistics Experiment Study (N=40)	P: promotion and content are key factors for weblog success R: impetus for research
Taras/ Gesser 2003 (j) Canada/ USA	"Greedy Associates" (GA) phenomenon	N/A	Conceptual	P: VC are worth watching R: N/A
Valentine et al. 2010 (j) USA	Ethical aspects of firing employees due to their blogging activites	Related to Integrative Social Contract Theory	Explorative study (N=401), Regressions and variance analysis (ANOVA)	P: definition of fair blogging policies R: ethical aspects in further blogging scenarios
Warisse Turner et al. 2006 (j) USA	Relation between media usage (virtual presence) and performance appraisal	Related to social influence theory and media richness	Study and interview (N=88), Hierarchical regession	P: careful definition of media-usage policies F: further organizational, media-related, and appraisal-related aspects
Wiesenfeld et al. 2001 (j) USA	Social aspects in the virtual workplace	N/A	Study (N=250) Regression analysis	P: social support strengthens organizational identification, investment in sophisticated ICT R: explore organizational identification in context of virtual workplaces

Figure 1: Overview of VC_{HR}-research. (j) = published in journal, (p) = published in conference proceedings, P = implications for practice, R = implications for research.

2.3 Content Analysis

In this subchapter, a short overview of the content along the criteria explanation aim, theory, method, and implication is presented. The *explanation aims* are heterogeneous and thus can confirm the VC-relevance in the assumed and further HRM areas: recruitment [37, 40, 80], development [3, 5, 15, 42, 95], leadership [1, 19, 25, 118, 121, 124], work organization and organizational communication [23, 74, 102, 110, 113], and industrial relations [98, 115]. Further, the contributions show deficiencies in their *theoretical foundation*. Only two contributions [19, 42] apply an explicit theory while other three [25, 118, 121] relate to selected models and frameworks. Yet, all contributions base upon a thorough literature review and discussion of previous concepts to formulate research questions and hypotheses. Also in regard to the applied *method*, quite explorative research character becomes obvious. Two third of the contributions apply a qualitative or quantitative study. Hereof, three contributions [37, 110, 118] explicitly declare themselves as explorative or action research while the

remaining on third of the whole selection is conceptual and likewise gives reason for future research. Finally, the majority of contributions derive *implications* for practice and research in order to benefit from the results.

2.4 Contextual Discussion

The identified VC_{HR}-research contributions are discussed below in the context of HRM considering further literature to strengthen the evidence of the selected contributions. Basically, the review selection concerns recruitment, career support, leadership, organizational communication, and KM, as well as aspects of industrial relations. This rather broad set of HR-relevant areas is definitely not arbitrary but rather reflects a comprehensive initial review of the area.

VC offer potential in *recruitment*. Benefits may be realized by applicants which attend applicant communities for information exchange and support, or by organizations which gather information from applicant communities or initiate or take part in applicant-HR communities for recruiting purposes. Laumer et al. 2008 [80] explored on the one hand the (frequent) usage of virtual worlds, a special kind of VC, by job seekers and on the other hand the (positive) experience of a popular company from the IT-sector which established a recruiting center in Second Life (SL). Ebner et al. 2009 [37] suggest to exploit company-initiated external R&D communities also for recruitment purposes as those communities make significant applicant information available.

VC can also *support career investments*. This may be in form of intra- or extra-organizational career communities [40, 95] or as special forms of general e-mentoring [38]. Ettinger et al. 2008 [40] focus on aspects of participating in recruitment platforms and conclude that job seekers are inclined to use this recruitment and career support if community- and network-supporting applications are offered. Parker et al. 2004 [95] explore the concept of career communities in order to identify possible characteristics and typology. They find that practical career communities comprehend a set of ideal types and serve different functions such as career support, sense-making, and learning. They emphasize that future career support requirements probably cannot be met only by company-internal concepts so that extra-organizational relationships gain in importance. Further, the concept of e-mentoring as presented by Ensher et al. 2003 [38] should be considered in this context, as recent mentoring definitions go beyond dyadic relationships and mentoring roles also include personal relationships which enhance social, affective support. E-mentoring can be attached either to informal networks to support personal career endeavours or to formal organizational development and leadership strategies.

VC offer *options for e-leadership*. E-leadership, defined as execution of measures (power, rewards, expertise, role-modeling) to motivate individuals or groups to fulfil certain task in a virtual environment [e.g. 7, 104], can be perceived as a subset of e-HRM and becomes increasingly important in the virtual workplace. Bock et al. 2008 [19] explore the impact of leadership characteristics perceptions on motivation and organizational commitment. Being focused on non-work related communities (within the organizational setting), they affirm the supposition that the existence of virtual relationship-oriented communities (in contrary to task-oriented virtual teams) positively influence employees' work habits. Awareness on adequate leadership styles even increases the probability of a positive outcome. Respective measures to create a sense of belonging and trust which can be enhanced by colleague- or leadership have impacts on employee satisfaction and commitment [1, 124]. Executives also need to carefully consider (media usage) policies in order to prevent discrimination as well as ethical and

legal issues which might influence commitment and performance negatively [25, 118, 121].

VC influence *organizational communication and KM*. In general, HR-relevant issues are associated with organizational issues such as organizational structures (positions and hierarchies) and communication structure (ICT usage). It is the function of HRM to recruit, develop, and compensate employees and, therewith, motivate them to fulfill their task-specific roles. Then it is to examine which impact modified organizational and communication structures might have on motivational measures and strategies and if social, relationship-oriented aspects need to be particularly considered in regard to network-oriented organizational forms and ICT-usage [109, 124]. The assumption is that VC usage facilitates knowledge acquisition and exchange.

In more detail, diverse reciprocal ICT applications (discussion boards, weblogs, chat) serve as a technological prerequisite for VC. Thus, to explore the impact of such tools for organizational and occupational relationship building is worthwhile. While Cho et al. 2005 and Quan-Haase et al. 2005 [23,102] surveyed the potential impact of IM, which offer benefits for effective communication in form of their presence awareness functions [110], Stocker & Tochtermann 2008 [113] surveyed weblogs, whose value stems from the interlinked conversationality in the blogosphere [e.g. 56]. Also virtual worlds, defined as visually supported webchats, offer a trend for relationship-oriented organizational communication and e-leadership [74].

Then, VC can serve as a measure for organizational KM. While KM is a part of product development to spur innovations [e.g. 37], knowledge communities can also be relevant in HRM as they can be a measure for training and development and support deployment planning and promotion on career paths [5, 113, 119]. KM is increasingly important in knowledge intensive organizations and modified organizational forms such as dispersed and less hierarchical workplaces. The concept of virtual communities of practice (vCoP) also delineates virtual communities in this context [e.g. 5, 29, 36].

Finally, and in addition to HRM-functions and work organization, VC trends in *industrial relations* should be considered. Due to their networking and information exchange possibilities, VC offer opportunities for job seekers and employees to exert power in regard to the negotiation of compensation and other working conditions [98, 115]. Although such forms of employee communities do not substitute formal unions and their impact is dependent on the design (e.g. traffic, individuality, trustworthiness, topicality) as well as the economic cycle, its existence is 'worth watching carefully' [115]. Further, there is a general discussion on the impact of ICT on unions to offer new option for information and services, recruitment, networking, and campaigning [e.g. 47, 96]. Thus, terms such as *e-voice* and *e-unions* indicate two trends: a) the existence of informal virtual employee communities which render beneficial (individual) negotiation positions in regard to employers, b) formal virtual employee communities (interactive communication of union members) which enhance attractiveness and efficiency of unions.

3 Research Outlook

With reference to the rigor vs. relevance debate one could argue, that in regard to the scarcity and scattered kind of contributions, VC_{HR}-research is neither relevant nor rigorous because it is almost not existent. In this regard, the rigor vs. relevance debate is groundless. But, practice shows a great variety of HR-relevant arenas, e.g. company external job boards and employee-oriented industry specific web-based platforms as

well as company-internal ICT (e.g. intranets) which nowadays offer a variety of interactive applications for discussion and thus also for VC. Based on this practical evidence, the suspected conclusion that the scarcity of VC_{HR}-research contributions goes along with its irrelevance might be premature and the proposed initial selection might be rather seen as the potential advent of an emerging research area, potentially set in the larger context of e-HRM. This assumption is supported by the fact that analogies from existing VC-research areas are to question, e.g.:

- How are VC_{HR} characterized?
- Subsequently, must the design of VC_{HR} differ from the design of VC in other areas (e.g. commerce and marketing, relationship and leisure)?
- Do organizational settings provoke different considerations of social cues? E.g. does trust have a different impact in the customer-vendor and the employee-employer relationship?
- Does HRM need strategies to cope with a potential loss in their governance potential (hierarchy and information) due to the potential of company-external peer-to-peer information exchange and support?
- Do VC_{HR} generate positive/negative economic consequences for HRM?

Because of the gap between research and practice is (intended to be) bridgeable [45], VC_{HR}-research is of relevance in order to support HR-executives to manage and to benefit from the existence of the widespread VC phenomenon. Academic research is important because the existence and usage of VC is no self-evident panacea for communication, information, and relationship disorders. In contrast, being untrained and unaware in the handling, VC application or participation may result in undesired, costly outcomes. Thus, beside a rigorous research approach and implications for future research, VC_{HR}-research should offer explicit practical implications. Often, practical implications are too general and of minor use ('Managers must foster trust and interactivity to support participation and commitment as prerequisites for VC-success.'). It is useful to transfer available VC-knowledge into the HRM-context in order to create new context-specific, quite explicit knowledge in form of specific design and management scenarios instead of producing scenarios adequate for other contexts or rather general design and management principles [4]. Although being discussed controversially, it seems purposeful that useful implications are co-developed by practice and research [45]. Thus, research is ideally problem-initiated and based on valid academic approaches [4]. So, applied research approaches should meet academic standards and fit the (practice-oriented) explanation aim. Yet, co-developed management knowledge – termed either as problem-initiated research or evidence-based management – cannot release entirely the tension between rigor (general knowledge) and relevance (contextual knowledge) so that an increase in one of the paired aspects is only obtained at the expense of the other.

In sum, the existing modicum of VC_{HR}-research is based only on few scattered studies and conceptualizations. This portrays a developing research area as currently neither a common definition or research framework nor a critical review of hitherto research results is available. The following subchapter intends to lead to problem-initiated research by which implications for practice and future research can be derived likewise.

VC-research does not differ from other research fields in regard to basic approach options whose essential selection criteria is the explanation aim. Thus, encircled by explanation aim and implications, options in regard to perspective, definition, typology, theory, and method are considered in detail.

3.1 Perspectives

The multidisciplinary nature of VC_{HR} implicitly effectuates multiple perspective taking and is in favor of a multidisciplinary research approach [99]. Nevertheless, it seems advisable to explicate the respective focus to distinguish different research endeavors.

The social perspective focuses on the interpersonal relationships of the participants. The technical or design perspective reflects either the information and communication technology (ICT)-structure or the strategic management. Systems and applications are frequently regarded as a prerequisite and thus neglected in the discussion of the social and economic perspective. This results in a heterogeneous comprehension of the VC-term and rather general implications for VC-design and -management. Finally, the economic perspective focuses contingent economic benefits and costs of participation and usage.

Although it is possible to depict different perspectives conceptually, they are obviously intertwined. Basically, VC are social entities (communities) which are realized on a technical basis (virtuality) and as such are socio-technical phenomena. This results in discussions on the societal impact of VC and a great number of research contributions on the attitude, intentions, and behavior of participants. Along with the increasing usage, also the economic impact became apparent and VC were considered within a socio-(technical-)economic perspective, which pairs social and economic variables [41]. With respect to the economic perspective, existing or missing affective, social aspects are found to influence VC-success [e.g. 8, 16, 21, 27, 100, 106, 126], system characteristics [e.g. 81, 82, 86], and rather cognitive benefit-cost evaluations [e.g. 10, 53, 107]. VC-research in the context of marketing and e-commerce particularly explores the impact of VC on the consumer decision process (brand communities) [e.g. 9, 12, 30, 78, 91, 92, 97, 108].

3.2 Definition

There is no single VC-definition due to respective perspectives and application scenarios as well as different concepts on the understanding of community and reality [e.g. 44]. This also aggravates VC_{HR} -research, as common VC-definitions are too context-specific and restrictive whereas potential synonyms (e.g. social media, web 2.0) are imprecise. Further conceptualization is definitely needed to shape a definition attended by an adequate set of characteristics to develop a likewise adequate typology. For that, some basic considerations are suggested to enhance consistent future research.

VC_{HR} are defined as groups of HR-actors who predominantly utilize web-based ICT to discuss HR-relevant topics. Thus, actors, ICT, and discussion (as a specific of transaction) are the main dimensions of VC_{HR} . Actors are applicants, employees, and HR-executives who are engaged in HR-relevant transactions. Applicants are company-external actors whose actions are pre-contractual. Employees are company-internal actors whose actions are post-contractual. The term 'HR-executives' is a subsumption of company-internal actors, i.e. either line managers or managers of the HR-department, and company-external actors, e.g. HR-consultants. Actors are in particular characterized by the degree of their interpersonal belonging. Access to web-based ICT is possible via

Internet, Intranet, or Extranet. The technical core is based on community-oriented applications. Whereas information applications (e.g. search engine, profile engine, rating scales, and file sharing applications) deliver important community-supporting functions, reciprocal communication applications (discussion boards, weblogs with comment functions, webchats) are prerequisites for dialogue-oriented communication and discussion. Depending on the definition, also a combination of both application categories may form a VC in a broader sense, which then can be depicted by related terms such as web 2.0, computer-mediated communication, or social media. VC-specific transactions are basically discussions and topics could either be HR-function-specific (e.g. recruitment including marketing and pre-selection, development, or relationship-oriented leadership) or HR-function-comprehensive (e.g. HR-administration and -strategy). Further, two different transaction objects can be distinguished. Discussions can be specified as exchange of information or exchange of social goods (e.g. recognition, sense of belonging) in the HR-context.

Figure 2 displays the fundamental characteristics of VC_{HR} .

Dimension	Attribute	Value			
		Actors	Participants	Applicants	Employees
	Interpersonal Belonging	Closely-coupled		Loosely-coupled	
System	Access	Internet		Extranet	Intranet
	Communication Application	Discussion Board		Weblog	Webchat
Transaction	HR-topic	Function-specific			Function-comprehensive
	Transaction Object	Information			Socials

Figure 2: Fundamental Characteristics of VC_{HR} .

3.3 Typology

Based on the proposed fundamental characteristics, five ideal VC_{HR} -types are determined. The proposed typological terms ground on actors' relationships. This is only one, yet practicable and common possibility of denomination in analogy to terminology in other disciplines. A distinction is made between company-external (indicated by 'ex') and company-internal (indicated by 'in') types.

Company external virtual applicant communities ($A2A_{ex}$) are loosely-coupled groups of applicants who exchange information on future employers, positions, and working conditions which can provide decision support and a basis for negotiation. Participation is voluntary and publicly accessible via the Internet. Common applications are discussion boards or weblogs. Virtual applicant communities affect recruitment. Applicants benefit from peer-information on application proceedings and from being better prepared for interviews. Companies risk a loss in their informational preeminence and might want to observe applicants' discussions in order to detect comments which negatively impact the employer reputation. But they also might benefit from advantages in the pre-selection process if they have, dependent on the respective business model offered by the community operator, access to applicant profiles and contact data. Examples are [62, 67, 71].

Company-external virtual HR-to-applicant communities ($HR2A_{ex}$) are loosely-coupled groups of HR-representatives and applicants who exchange information in the context of personnel marketing and pre-selection. Participation is based on the company's

strategy and thus most likely obligatory for HR-representatives and voluntary for applicants. HR2A_{ex} are publicly (Internet) or partly-publicly (Extranet) accessible. Common ICT-applications are weblogs and webchats. HR2A_{ex} support recruitment. Company and applicants benefit from an exchange which can be decoupled from time and place in case of asynchronous communication applications and from supporting visual cues e.g. in case of synchronous communication in virtual world environments. Restrictions are apparent in regard to the verification of identity. Examples are [61, 66, 69].

Virtual HR communities (HR2HR_{ex}/HR2HR_{in}) are comparatively persistent and closely-coupled groups of HR-representatives. Discussions can be either function-specific or function-comprehensive and have the purpose to exchange expert information and social support to enhance operational and strategic HR-tasks. Participation in and access to HR2HR depends on the operator. In case that a HR-association or specific company operates the community, the access usually is restricted to members. Discussion boards on the Internet are common applications. As an assumption, HR2HR are beneficial to HR-representatives as they offer membership in an expert community which can positively influence task-specific and relationship-oriented leadership performance. Company-external examples are [59, 60, 63, 68, 70].

Virtual employee communities (E2E_{ex}/E2E_{in}) are groups of employees who exchange information and social support in a broad range of issues relevant for employees. Discussions are rather function-comprehensive and include working conditions (e.g. workplace organization, compensation), personal and occupational development as well as other occupational challenges (e.g. work-life balance, workplace bullying). The range of issues depends on the operator and declared purpose of the community. External operators may allow a more diversified discussion while internal communities may be task-specific or generally restricted to issues which do not conflict formal and informal company-specific policies. As E2E appear as a highly diversified type, participation and access as well applications also depend on operator and purpose. E2E in particular affect development and leadership. In regard to development, E2E could be formal relationships in e-learning concepts or rather informal relationships in knowledge management, denominated as knowledge communities or communities of practice. In regard to leadership, also company-external E2E are of particular interest, as they can resemble an outspoken rumor mill and thus serve as employee complaint sites (also: gripe boards) where employees share their experiences with working conditions and leadership styles with respective negative consequences (irritation or legal action) for the involved parties [9, 115]. Also, new communication options for formal or informal unionization appear [e.g. 47, 96]. The assumption is that employees benefit from the extended option of informational exchange and social support while companies need to understand VC-dynamics and make media-usage and monitoring policies carefully. Company-external examples are [58, 64, 65].

Company-internal virtual HR-to-employee communities (HR2E_{in}) are rather closely-coupled groups of HR representatives and employees who exchange information and social support in the context of development and (relationship-oriented) leadership. Participation is basically voluntary yet dependent on company-specific structures and strategies. Access is granted to company-internal members only. While diverse applications are optional in the Intranet, webchats become a trend in those virtual workplaces using virtual world technologies. Given that HR-actors include trainers, HR2E_{in} enhance training and development options in knowledge intensive companies as well as in the virtual workplace. In regard to leadership, occupational support and

recognition can positively influence employee satisfaction and commitment. Due to its company-internal status, equally to $E2E_{in}$ and $HR2HR_{in}$, examples can be given only in case study approaches.

Other conceptual types are out of the scope of a general analysis. $E2A_{ex}$ is a rather uncommon relationship, as there is no specific need for exchange. In the case that employees are exploited for personnel marketing and recruitment purposes, this relationship can be subsumed under $HR2A_{ex}$. Similarly, the delineation of $HR2E_{ex}$ is of minor relevance. Virtual discussions on industrial relations are held within each group ($HR2HR$ or $E2E$), company-internally ($HR2E_{in}$), or between HR-actors and counselors (lawyers or mediators) who however do not fit the HR-notion.

3.4 Theories

Although the review displayed a marginal theory-based foundation and this might be an indicator for explorative research instead of a lack in rigor, benefits could be derived from an intensified consideration of theory application found in general VC-research. In short, sociological as well as media- and ICT-related theories are already applied in VC-research, while economic theories are underrepresented although their examination might shed more light on costs and benefits of VC_{HR} participation and usage.

Basically, VC are kinds of relationships. The intention of respective research endeavour then is to a) to describe aspects of the relationships, b) to explain aspects of the relationships, and/or c) to compare VC relationships to other (non-)mediated relationships. To this, researchers can rely on a heterogeneous pool of theories which may be strictly applied, tested, or extended. Theories may stem from media and IT sciences, sociology, as well as business administration and economics. Yet, the classification of single theories to a certain perspective is rather difficult due to the multidisciplinary nature of VC and respective research.

With regard to a social perspective, social network theories [e.g. 51], small world theory [90], social capital theory [e.g. 24, 87], and Social Cognitive Theory [e.g. 11] can be transferred to VC-research e.g. in order to emphasize the need to embed ICT into the social structure [72], to understand forms of social capital in VC in comparison to physical communities [28], to explain implications of VC on social engagement [e.g. 16, 75] and factors of information sharing in VC [22, 89, 127]. Further, theories of social presence [111] and social translucence of technology [39] reflect VC-design in order to its ability to generate virtual social cues – visibility, awareness, accountability, social context – in the absence of physical social cues [103]. While on the one hand, former lacks of social cues in text-based VC [123] are mitigated by the availability of VC-supporting visualization options (e.g. buddy lists, virtual worlds), on the other hand, the fit of the specified traditional theories must be discussed in regard to new strategies in relationship building and delivery of social and emotional cues in VC [23]. VC are exposed to a process of evolution and can be examined by respective models [e.g. 98]. This is to explore life cycles in regard to different dimensions, such as VC-phases (e.g. early, mature, dissolving), structures (e.g. degree of trust, commitment), and memberships (e.g. lurker, regular, senior).

With regard to the socio-technical-economic perspective, such theories are to be considered that potentially relate media characteristics and ICT usage to organizational behavior and outcomes. Gupta & Kim 2007 [54] apply the theory of reasoned action [46] and technology acceptance model TAM [120] combined with attitude-behavior theory [43] to explore cognitive as well as affective determinants on attitude and

behavior. Lin 2008 [86] applies the IS success model [31] to identify system characteristics and social factors which influence member loyalty as an indicator for VC-success. Also of interest are the uses and gratifications approach [18], theories of media choice [26, 32], and adaptive structuration theory [33, 93] to explain media usage [107] as well as to explore task-specific and contextual effects of VC-usage [7, 20, 23, 74].

Although at least transaction cost effects are mentioned [52, 127], economic theories are not applied. Yet, also economic theories might be beneficial for VC-research as e.g. transaction cost theory [125] offers an explanation for VC_{HR}-existence and principal agent theory [2, 57] supports the analysis of hierarchical structures in general and trust and incentives in this hierarchical relationships in particular.

3.5 Methods

Although the review already displayed a variety of methods, insights into general VC-research can help to consider specified options. Thus, a selection of methods is presented which also could be considered in VC_{HR}-research endeavors. Adaptations of traditional methods might be necessary in particular due to the fact of a web-based research object [e.g. 13, 48, 73, 79, 88] but also due to organizational settings [e.g. 113].

With regard to the socio-technical perspective, common data analysis methods which are basically based on observation and transcripts are social network analysis [e.g. 116, 122] in order to link concepts of social and technical networks [e.g. 50, 123] and netnography (as a standardized approach in contrast to online or virtual ethnography) with special regard to interpretive analysis of consumer behavior in cyberspace [77, 79]. Further and partly intertwined with these methods, logfile analysis [112, 117], data mining [94], and other automated methods, e.g. chatbots and polls [49] are applied to gain insight into VC-structures.

Further, modeling serves to illustrate causality in particular between VC-usage and VC participants' behavior. With regard to the economic perspective, this is attached to economic relevant measures (e.g. commitment, success). Here structural equation modeling (SEM) analyzed with LISREL [22, 34, 53, 86, 100, 127], AMOS [119], Partial Least Square Analysis (PLS) [19], and Bayesian Belief Networks (BBN) [28] have already been applied.

4 Conclusion

The paper intended to depict the hitherto neglected e-HRM subset of VC_{HR} – which are web-based and community-oriented discussions with relevance to HRM. VC_{HR}-research is considered to be of relevance as there is practical evidence of the phenomenon in form of virtual applicant communities, virtual HR-to-applicant communities, virtual HR communities, virtual employee communities, and virtual HR-to-employee communities. Although VC-research is abundant, the review found that HR-specific contributions are scarce, context-specific and not integrated into a broader framework. Faced the practical evidence, further research is desirable in order to structure the complexity of the phenomenon. A framework might spur VC_{HR}-research and puts emphasis on the fit between explanation aim, perspective taking, definition, typology, theory, method, and implications.

Future research endeavors might include: further definition and typology in particular in contrast to concepts such as social media, social networking, web 2.0 with HRM-relevance, VC_{HR} (functional) scenarios, business models, and prototypes, impacts of

not-controllable types, this is external virtual applicant or employee communities which are out of the reach of explicit organizational control yet with potential impact on HRM strategies and processes, future technical developments in regard to the virtual workplace and virtual life, e.g. the impact of increasing virtual world applications.

In sum, one crucial aspect of the rigor vs. relevance debate is the general choice of a leading principle, this is if the existing gap between rigor and relevance is (intended to) be bridgeable or if it is not [45]. In case of VC_{HR}, one might favor the position that the rigor vs. relevance gap needs to be bridged as the undeniable existence of VC_{HR} faces an underrepresented research body. To extend the latter might serve to efficiently handle the management of and participation in VC in the context of HRM.

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