

# A Model for Assessing the Success of Virtual Talent Communities

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**Abstract.** Design characteristics constitute a promising approach to support researchers and practitioners in developing, implementing and improving/evaluating virtual talent communities (VTC) in order to prevent costly misconceptions in every phase of the software lifecycle. The paper aims at deriving a rigorous and relevant model for assessing the success of VTC, realised by use of the prototype SABINE so that researchers are able to better understand particular system-, information- and service-related VTC success drivers. Practitioners then have a valuable means for management interventions, task prioritisations as well as effective and efficient resource allocation at their disposal. The proposed model, validated via an online survey as well as a subsequent partial least squares (PLS) analysis, can be approved successfully. The positive results open up new options for further development and application of the model and VTC.

**Keywords:** DeLone and McLean IS Success Model, Evaluation Methods for TEL, Design Characteristics, Virtual Talent Communities.

## 1 Introduction

Facing the ongoing debate on “war for talent” [37] and the respective development of holistic, talent-oriented Human Resource Management (HRM) strategies and systems [50, p.20ff. + 38f.], interactive web-based applications for HR-related purposes are increasingly discussed [e.g. 19, 35]. Virtual talent communities (VTC) which are defined as a web-based applications for social interaction by different actors (i.e. talents [56], educational institutions, employers, intermediaries) with a shared interest especially in talent development and employment are an innovative kind of electronic HRM (e-HRM) [54] and an option to meet economic and social requirements of organisations and the generation V(irtual) [24] as well. Yet, although VTC reflects a promising integrative approach, mostly partial applications (e.g. e-learning

applications, virtual job boards and fairs, company career websites, social networks) exist. Hence, rigorous and relevant approaches for the development, implementation and improvement of VTC are needed to be developed and validated. Rigorous approaches are characterised by sound foundations and methodologies (e.g. theoretically-based research models), whereas their relevant counterpart stands out by the explicit consideration of practice-oriented business needs. Scholarly based on a design characteristics approach [27], it is of great importance to investigate the determinants of VTC success systematically in order to assist system designers in building and operating systems that are useful and accepted. As VTC are an innovative concept and the application of the design characteristic approach in HRM constitutes a new research field [41] literature on both is scarce. Initial research which includes a rigorous foundation to substantiate the VTC concepts confirms the usefulness of the above-mentioned approach and elicits basic design characteristics for VTC [39]. Benefits of VTC (e.g. facilitation of convenient, ubiquitous information and knowledge sharing processes, communication and relationship building, collaboration and transaction [e.g. 34]) can only be successfully realised if proper development, implementation and (continuous) improvement are assured [18, 31, 41, 49, 52], given the assumption that success is at least manageable to a certain degree [55]. Technically - as well as managerially-oriented literature [e.g. 29, 57] congruently understands design characteristics as a set of those properties which determine IS success in general, and VTC success in particular. Commonly classified into system-, information-, and service-related design characteristics [17], they support VTC-related stakeholders (e.g. decision makers, system developers/implementers, content providers, and end users) in developing, implementing and (continuously) improving/evaluating VTC based on talent-specific requirements [17, 18, 31, 52]. The purpose of this paper is to derive a rigorous and relevant research model based on earlier research [39] in order to assess the success of VTC from a talent perspective more appropriately [27]. A positive effect of such a research model is its potential to specify the measures for VTC success assessment so that research results could be better compared and findings better validated [27]. Below the research object is specified and the theoretical development as well as the research method are explained. They are followed by a presentation and discussion of the results. The paper ends with an overall conclusion.

## 2 Specification of the Research Object

The innovative VTC concept on an ideal multi-access integration of actors and functions in regard to HR-relevant processes in general, and talent development and deployment in particular have not been yet fully developed. Due to this fact, research on date must rely on initial approaches. Thus, the here applied SABINE<sup>1</sup> prototype does not depict an ideal and overall VTC but includes the main search and recommendation functions and basic interactivity functions for use in a VTC. As

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<sup>1</sup> SABINE was developed within the THESEUS-Project supported by the German Federal Ministry of Economics and Technology. <http://learning-demo.eu/talentcommunity/>

talents participate in trainings in general and e-learning courses in particular to acquire qualifications in order to (better) fit to jobs, the SABINE prototype's purpose is to support the process of acquiring job-fit qualifications. To this, the integrated usage of semantic web technologies (SWT) in the combined areas of e-learning and e-recruiting is evaluated. Unlike other approaches using SWT in either e-learning [7, 25] or e-recruiting [8, 22], SABINE integrates both areas in one platform and aims at recommending bundles of corresponding training and job offers. SWT attract attention in research since the occurrence of the semantic web in the new millennium because they extend the information by adding to it a well-defined meaning [6]. This enables sharing and reusing data across boundaries of applications, enterprises, and also communities [59] provided by standards that allow the computing of the data's underlying meaning (i.e. semantics) [65, p. 15]. For this purpose ontologies, a core SWT, are used. Ontologies "are formalised vocabularies of terms, often covering a specific domain and shared by a community of users. They specify the definitions of terms by describing their relationships with other terms in the ontology" [60]. In the SABINE prototype ontologies are used to model qualifications which characterise a talent's personal profile, learning and job offers. The SABINE-ontology, which was built by the ontology editor Protégé<sup>2</sup>, serves as a knowledge base for different steps in the system. In the backend publicly available training and job offers are crawled from multiple learning and job exchange platforms using a semantic information access framework<sup>3</sup>. Mostly these offers are written in natural language without marking up qualifications. It is difficult for an individual to identify which qualifications are needed for a specific job, what is an individual qualification gap and/or which training offer fits best to fill the qualification gap. It is a non-trivial process to comprehend the implicit qualification descriptions in training and job offers and to match them to one's personal qualification profile manually. To solve it, SABINE uses ontologies to analyse the offers and to identify qualifications. The prototype is able to handle with plain text and HR-XML<sup>4</sup>-formatted documents. At the end of this process, both training and job offers are semantically annotated with respective qualifications and stored in a database. The frontend of SABINE is programmed in HTML and JavaScript using the Google Web Toolkit for a high compatibility to all major browsers. The user is enabled to create a personal profile with standard data like the name and date of birth as well as personal qualifications. SABINE assists the qualification capturing by providing auto-completion during the input. The suggested qualifications originate from the ontology. Apart from manual creating one's personal profile (in yet another community), application programming interfaces to learning management systems and social networking sites (e.g. facebook, XING and LinkedIn) provide automatic data import, taking into consideration that the user can decide which data from a specific external source he wants to have it imported. The imported data is also analysed with the ontology's assistance. Making the annotated training and job offers as well as the talent's qualification profile available, SABINE is able to

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<sup>2</sup> <http://protege.stanford.edu/>

<sup>3</sup> <http://www.eclipse.org/smila/>

<sup>4</sup> <http://www.hr-xml.org/>

recommend offers that provide the best match between the personal qualifications and those inherent in the offers. The personal information collected from the user can be exported into HR-related formats (HR-XML, Europass) or saved as a portable document file of an automatically generated curriculum vitae. To enhance ubiquitous access, SABINE functions can be integrated into facebook and iGoogle as a widget.

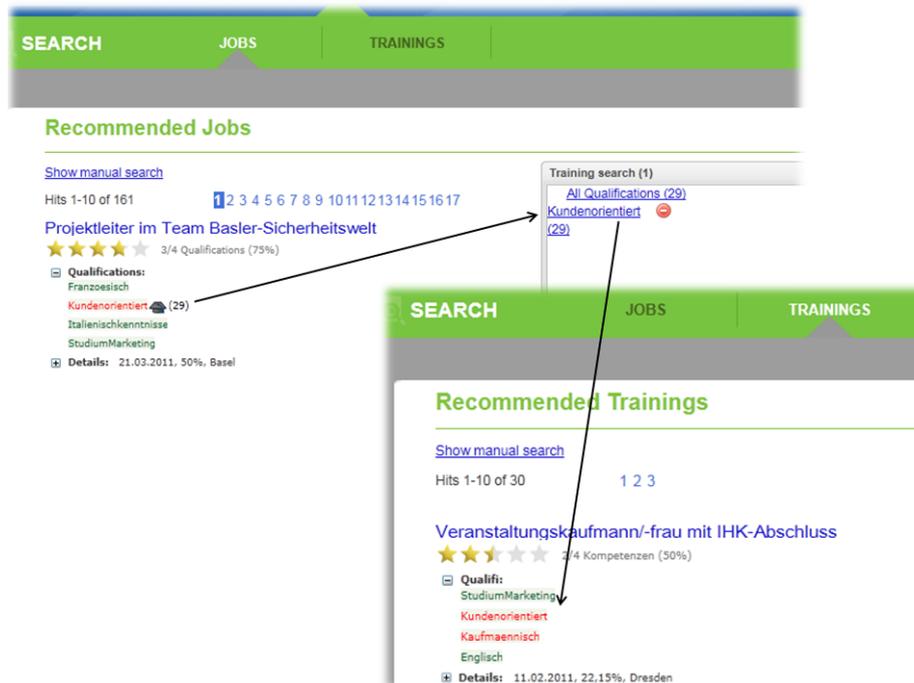


Fig. 1. Recommendation of Jobs, Selection of Qualifications, Recommendation of Trainings.

### 3 Theoretical Development

As rigorous and relevant research models for measuring VTC success from a talent perspective are missing at present, the subsequent elaboration therefore presents such an instrument which core principles are patterned according to the updated DeLone and McLean information systems (IS) success model (ISSM) [17, 51]. The ISSM is chosen as it presents a general framework for organising design characteristics relevant to the success of IS/VTC [17]. Basically, the ISSM offers three groups of coarse-granular IS/VTC success predictors, namely, *system quality*, *information quality*, and *service quality* [17]. Beyond, many validated measures for these success dimensions already exist, which would further drive the rigorousness of the proposed research model [27, 40]. In order to foster the relevance of the research model as well, based on the ISSM, medium-granular (i.e. operative) system-, information-, and service-related VTC design characteristics were derived by means of a cross-national,

talent-focused Delphi study [17, 39] (see Table 1). In addition to the constructs related to the aforementioned ISSM success dimensions, Table 1 depicts three further ISSM constructs which are incorporated into the research model due to their relevance to the ISSM, namely talents' behavioural intention (BI) to use, respectively satisfaction with VTC as well as their (perceived) net benefits (NB) of using VTC [17]:

**Table 1.** Design Characteristics of VTC: Constructs and Definitions Overview.

<b>Construct</b>	<b>Definition</b>	<b>Adapted from</b>
<b>System Quality</b>	System quality measures the specific properties of the VTC itself.	[17, 51]
Secure	VTC are secure if unauthorised actors cannot access, modify or delete personal data of third parties.	[40]
Interactive	VTC are interactive if they enable a communication exchange between different (groups of) actors.	[40]
Structured	VTC are structured if actors can detect the information made available in their graphical user interfaces effortlessly.	[40]
Fast	VTC are fast if they respond to the actors' requests for information promptly.	[64]
Appealing	VTC are appealing if their graphical user interfaces have a pleasant appearance.	[40]
<b>Information Quality</b>	Information quality measures the specific properties which refer to the information provided by the VTC.	[17, 51]
Relevant	The information provided by VTC is relevant if it fits the actors' requirements.	[40]
Credible	The information provided by VTC is credible if it originates from trustworthy sources.	[40]
Current	The information provided by VTC is current if it is updated constantly.	[39]
Understandable	The information provided by VTC is understandable if the words, sentences and abbreviations are clear in meaning.	[40]
Complete	The information provided by VTC is complete if it covers the information needs of the participating VTC actors comprehensively so that they do not need to consider other sources of information.	[40]
<b>Service Quality</b>	"[...] the overall support delivered by the service provider [...]."	[17, p. 25]
Low-Cost	The service provided by VTC is available at low-cost if the tangible and intangible input provided by the participating VTC actors is perceived as acceptable and affordable.	[39]
Responsive	The service provided by VTC is responsive if the VTC management is committed to high response rates and achieves to transfer this approach to the participating VCT actors.	[39]
Consultatory	The service provided by VTC is consultatory if it provides additional, decision supportive services relevant to the participating talents.	[39]
Ad-Free	The service provided by VTC is ad-free if the business model is based on alternative sources of revenue.	[39]
<b>Satisfaction</b>	VTC actor's opinion of the specific system-, information-, and service-related VTC properties.	[17, 64]

<b>BI</b>	VTC actor's intention to use VTC.	[14, 15, 57]
<b>NB</b>	Net benefits capture the balance of positive and negative impacts of VTC as well as their inherent information and service on their actors.	[14, 15, 17]

It is important to mention that first attempts towards a transmission of already existing design characteristics contingent on virtual learning environments (VLE) to the present HRIS sub-category VTC confirm the necessity of such research efforts [39]. This is due to the fact that two third of the design characteristics elicited in both contexts by use of rigorously applied Delphi studies turn out to be identical, thus indicating a trend of these particular design characteristics towards universal applicability (e.g. *appealing, interactive, secure, structured, credible, relevant, understandable*) [39, 40]. Based on the associations postulated by the ISSM, a research model is proposed. It assumes that system, information, and service quality as well as the sub-dimensions related to them are linked to talents' BI to use, respectively satisfaction with VTC [17]. Beyond, these success dimensions in turn influence talents' NB of using VTC.

#### 4 Method

The research model development procedure is patterned according to previous studies [13, 33, 38] which ensures the constructs to be rigorously developed and validated by means of a pretest as well as a pilot study using previously utilised measures. In particular, groups of items are compiled from validated instruments to represent each construct [13, 30]. The wording of each item is adapted to the VTC context, whereas appropriate item writing principles are considered [20]. In case there are no items for hitherto unknown constructs (see Table 1, e.g. *responsive, consultatory*), special attention is paid to their rigorous development [e.g. 13]. Hereafter, prior to the pilot test a preliminary online questionnaire is drafted and pretested by eight VTC experts (one professor, two PhDs, three PhD students, two master students, all of them experienced in the research topic, and the use of job portals for at least two years) to ensure an easy-to-understand item wording and questionnaire structure [33]. Each item is measured on a 5-point, Likert-type rating scale, ranging from 1 (strongly disagree) to 5 (strongly agree). All items, organised by construct, are presented in Table 2. In order to pilot test the research model prior to deploying it in the field, the survey questionnaire is tested pilotly with a group of 57 talents (i.e. apprentices, students, graduates, professionals looking for job and/or training offers). In particular, talents are approached via an online questionnaire during the first half of March 2011, encompassing a link to a demo video of the SABINE prototype (see Chapter 2). The selection of a video-based stimulus is mainly due to the fact that it enables "[...] designers [...] to visualise interface ideas [consistently] and get feedback early in the design process reducing the costs incurred by late design changes" [58, p. 61; see also 16]. The sample size of 57 talents is not considered to prevent the research model to show sufficiently high statistical power to validate the measurement models (i.e. constructs and items assigned to them), which are at the centre of the subsequent analysis. A validation of the structural model based on the associations postulated by

the ISSM is out of scope of this study as such an investigation requires measurement models to be validated exhaustively prior to this.

## 5 Results and Discussion

The research model is tested pilotly and analysed using partial least squares (PLS), a structural equation modelling (SEM) technique that is well suited for highly complex predictive models [3, 11]. PLS is the most appropriate given the large number of constructs that result from extending, and adapting the ISSM to the VTC context. Beyond, PLS requires minimal restrictions in terms of distributional assumptions and sample size which makes PLS the ideal method for testing the survey instrument pilotly [12]. In particular, smartPLS is used for the analysis [47]. All constructs tested are modelled using reflective items as this approach considers items to constitute replaceable reflections of their underlying constructs, which in turn makes the ongoing refinement of the research model highly convenient as only items have to be changed, but not their corresponding construct definition [9, 63]. The final research model includes 64 items representing 20 constructs (see Table 2). In particular, the analysis of each measurement model includes the estimation of the construct reliability as well as the convergent and discriminant validity of its corresponding items. Thereby, cronbach's alpha (CA) is almost entirely above the recommended level of 0.70 [33, 43], indicating adequate construct reliability [43]. The two exceptions are *fast* (-0.14) and BI (0.49), which therefore should be slightly modified in the ongoing research process as low inter-item correlations indicate that not the entire set of items reflects the "appropriate" construct domain systematically, thus producing slight tendencies of unreliability [13].

**Table 2.** Measurement Properties per Construct and Item: Results Overview.

Construct	Item	Adapted from	Mean	St. dev.
<b>System Quality</b> AVE = 0.86 CA = 0.92 CR = 0.95	In terms of system quality, I would rate the VTC highly.	[64]	3.26	0.94
	Overall, the VTC is of high quality.	[64]	3.25	1.02
	Overall, I would give the system quality of the VTC a high rating.	[64]	3.35	0.97
<b>Secure</b> AVE = 0.90 CA = 0.95 CR = 0.97	The VTC prohibits unauthorised actors to have a look at my personal data (e.g. via personal password).	<i>own-developed</i>	3.35	1.30
	The VTC prohibits unauthorised actors to modify my personal data (e.g. via personal password).	<i>own-developed</i>	3.37	1.20
	The VTC prohibits unauthorised actors to delete my personal data (e.g. via personal password).	<i>own-developed</i>	3.42	1.27
<b>Interactive</b> AVE = 0.88 CA = 0.93	The VTC enables a contacting with other actors of the VTC (e.g. via chat, forum, private message, video conference).	[62]	3.04	1.38

CR = 0.96	The VTC enables an exchange of information with other actors of the VTC (e.g. via chat, forum, private message, video conference).	[36]	2.95	1.36
	The VTC enables an exchange of documents with other actors of the VTC (e.g. application via private message).	[36]	2.98	1.37
<b>Structured</b> AVE = 0.74 CA = 0.83 CR = 0.90	The graphical user interface of the VTC is very consistent.	[28]	3.95	0.85
	The graphical user interface of the VTC has a very clear structure.	[42]	3.81	1.06
	The graphical user interface of the VTC is very easy to navigate (e.g. via navigation bar, site map).	[2]	3.79	0.92
<b>Fast</b> AVE = 0.63 CA = -0.14 CR = 0.46	The VTC provides information in a very timely fashion.	[64]	3.93	0.70
	It takes too long for the VTC to respond to my requests.	[64]	2.53	0.89
	Web pages load very fast in the VTC.	[32]	3.61	0.75
<b>Appealing</b> AVE = 0.83 CA = 0.90 CR = 0.93	The graphical user interface of the VTC is visually very appealing.	[48]	3.72	1.06
	The graphical user interface of the VTC is very modern looking.	[48]	3.82	0.97
	The graphical user interface of the VTC is very well depicted with buttons and symbols.	[28]	3.60	1.08
<b>Information Quality</b> AVE = 0.84 CA = 0.91 CR = 0.94	Overall, I would give the information provided by the VTC high marks.	[64]	3.42	0.89
	Overall, I would give the information provided by the VTC a high rating in terms of quality.	[64]	3.30	0.93
	In general, the VTC provides me with high-quality information.	[32]	3.25	0.91
<b>Relevant</b> AVE = 0.65 CA = 0.72 CR = 0.85	The job offers provided by the VTC fit my qualification profile very well.	[62]	3.37	0.96
	The training offers provided by the VTC fit my qualification profile very well.	[62]	3.28	1.03
	The information provided by the VTC is very relevant in achieving my job-related goals (e.g. recommendation of suitable job and/or training offers according to my current qualification profile).	[10]	3.16	1.00
<b>Credible</b> AVE = 0.75 CA = 0.84 CR = 0.90	The information provided by the VTC is very credible.	[44]	3.40	0.98
	The information providers represented in the VTC have a very good reputation.	[44]	3.05	1.03
	The information provided by the VTC originates in highly approved sources of information.	[32]	2.93	0.96
<b>Current</b> AVE = 0.77 CA = 0.85	The information provided by the VTC is up to date (e.g. job and/or training offers).	[62]	3.21	1.00
	The information provided by the VTC is	[64]	3.28	0.98

CR = 0.91	updated regularly (e.g. job and/or training offers). The information provided by the VTC considers the most recent developments (e.g. the job and/or training offers recommended are adapted to my current qualification profile constantly).	[32]	3.46	0.98
<b>Understandable</b> AVE = 0.64 CA = 0.81 CR = 0.87	The information provided by the VTC is very easy to understand.	[62]	3.74	0.88
	The words, sentences and abbreviations of the information provided by the VTC are very clear in meaning.	[62]	3.61	1.05
	The meaning of the information provided by the VTC is very easy to understand.	[5]	3.67	1.12
	The information provided by the VTC is self-explanatory.	<i>own-developed</i>	3.40	1.00
<b>Complete</b> AVE = 0.70 CA = 0.79 CR = 0.88	The range of information provided by the VTC enables me to realise my job-related objectives successfully.	[45]	3.16	1.05
	The range of information provided by the VTC covers my information needs comprehensively whilst searching for adequate job and/or training offers.	[64]	2.88	1.00
	The range of information provided by the VTC is sufficiently comprehensive so that I do not have to consider other sources of information whilst searching for adequate job and/or training offers.	[45, 42]	2.30	1.07
<b>Service Quality</b> AVE = 0.87 CA = 0.92 CR = 0.95	In terms of service quality, I would rate the VTC highly.	[64]	3.12	0.89
	Overall, the service of the VTC is of high quality.	[64]	3.04	0.87
	Overall, I would give the service quality of the VTC a high rating.	[64]	3.05	0.87
<b>Low-Cost</b> AVE = 0.82 CA = 0.89 CR = 0.93	The cost of the VTC-specific services fit my current budget available.	[61]	2.88	1.05
	The VTC-specific services are available at a very low price.	<i>own-developed</i>	3.04	1.12
	The VTC pricing model is very adequate.	<i>own-developed</i>	2.89	0.98
<b>Responsive</b> AVE = 0.83 CA = 0.90 CR = 0.94	The VTC contact persons always respond promptly (e.g. to my service-related requests).	[46, 26]	2.91	0.97
	The VTC contact persons are always willing to help me immediately.	[26]	2.86	1.01
	The VTC contact persons always understand my service-related needs immediately.	[1, 4]	2.89	0.90
<b>Consultatory</b> AVE = 0.72 CA = 0.80 CR = 0.88	The VTC provides contact data for personal coaching and consulting.	[32]	2.95	0.91
	The VTC provides additional, talent-relevant service offers (e.g. how-to-behave-in-a job interview, how-to-create-	[32]	3.04	1.00

	an electronic curriculum vitae/e-portfolio). The VTC provides an individually available support (e.g. via FAQ, forum, phone-hotline).	[21]	2.98	1.11
<b>Ad-Free</b> AVE = 0.56 CA = 0.77 CR = 0.78	The VTC does not contain advertisements. The VTC business model enables me using the VTC ad-free (e.g. via subscription). The VTC enables me to hide advertisements effortlessly.	<i>own-developed</i> <i>own-developed</i> <i>own-developed</i>	3.51 3.39 2.96	1.17 1.19 1.10
<b>Satisfaction</b> AVE = 0.73 CA = 0.93 CR = 0.94	All things considered, I am very satisfied with the VTC. Overall, my interaction with the VTC is very satisfying. Overall, the information I get from the VTC is very satisfying. I am very satisfied with the information I receive from the VTC. Overall, the service I get from the VTC is very satisfying. I am very satisfied with the service I receive from the VTC.	[64] [64] [64] [64] [64] [64]	3.44 3.25 3.32 3.30 3.14 3.11	0.82 0.97 0.89 0.84 0.95 0.88
<b>BI</b> AVE = 0.55 CA = 0.49 CR = 0.61	Assuming I had access to the VTC, I intend to use it. Given that I had access to the VTC, I predict that I would use it. Assuming I had access to the VTC, I plan to use it in the next <n> months (number of months).	[14, 15] [14, 15] [14, 15]	3.68 3.53 13.44	0.97 1.12 36.30
<b>NB</b> AVE = 0.92 CA = 0.96 CR = 0.97	Using the VTC improves my chances for success to get adequate job and/or training offers. Using the VTC increases my effectiveness to get adequate job and/or training offers. Using the VTC enhances my efficiency to get adequate job and/or training offers.	[14, 15] [14, 15] [14, 15]	3.54 3.63 3.61	0.96 0.99 1.00

AVE=Average Variance Extracted; CA=Cronbach's Alpha; CR=Composite Reliability

In the fashion of CA, the composite reliability (CR) of almost all constructs, except *fast* (0.46) and BI (0.61), demonstrates satisfactory levels of at least 0.70 as well [33, 43], equally indicating adequate construct reliability [43]. The average variance extracted (AVE) of all constructs shows levels above the recommended limit value of at least 0.50 so that a satisfying construct reliability can be approved entirely [23]. At the same time, AVE values confirm the items to exhibit appropriate convergent validity [23]. Beyond, discriminant validity of the items deployed is found to be satisfactory as the square root of the AVE of each construct is higher than the correlations of that construct with all other constructs of the research model (Fornell-Larcker criterion) [23]. Discriminant and convergent validity are further approved as almost all items, except *ad-free* (first item) and BI (third item), demonstrate loadings above 0.50 on their associated constructs [53], and the item loadings within each

associated construct are found to be higher than those across constructs. This result is mainly due to the fact that the video-based VTC stimulus applied (see Chapter 4) does not support particular functionalities, respectively specific design characteristics attributed to these functionalities (e.g. *ad-free*). Hence, the current item pool will be revised and further developed in the ongoing validation phase of this research project to ensure universal applicability of the item pool concerning the HRIS sub-category VTC, whereas a generally recommended minimum of three items per construct is targeted [30]. Based on the current item pool, the significance of the item loadings is analysed using a bootstrapping procedure with 200 samples. Fortunately, all loadings are significant at the 0.05 level, disregarding the following constructs: *Ad-free* (first item), *BI* (third item), and *fast* (all items).

## 6 Conclusions

Within this paper, first steps in the development of a rigorous and relevant research model for assessing the success of VTC from a talent perspective are undertaken [27]. Therewith, a first validated set of relevant VTC design characteristics can be offered to practice. In particular, the research model may facilitate system evaluators in the assessment of VTC which could lead to improved levels of task prioritisation and resource allocation from a VTC decision maker viewpoint. At the same time, the research model can help VTC stakeholders to better understand the relative importance of particular design characteristics on VTC success. Hence, the proposed research model can serve as a checklist to better assess in how far VTC fulfill the requirements postulated by prior research efforts in this subject domain [39]. Refining and customising such a checklist towards individual VTC settings, and subsequently, considering the list may lead to practical VTC development, implementation and improvement processes which may minimise talent resistance, increase talent satisfaction, *BI*, *NB*, and thus, overall VTC success.

This hopefully will also stimulate future research, especially quantitative studies, to reduce significantly the number of measures applied for VTC success assessments in order to make research results better comparable, and findings better validated [17]. However, as mentioned, the research model requires some further development and validation firstly before it can be applied in practice finally.

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