

Lecture Notes in Networks and Systems 497

Leonard Barolli *Editor*

Complex, Intelligent and Software Intensive Systems

Proceedings of the 16th International
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and Software Intensive Systems
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Leonard Barolli
Editor

Complex, Intelligent and Software Intensive Systems

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Conference on Complex, Intelligent
and Software Intensive Systems (CISIS-2022)

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Editor

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Welcome Message of CISIS-2022 International Conference Organizers

Welcome to the 16th International Conference on Complex, Intelligent and Software Intensive Systems (CISIS-2022), which will be held from June 29 to July 1, 2022, in conjunction with the 16th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2022).

The aim of the conference is to deliver a platform of scientific interaction between the three interwoven challenging areas of research and development of future ICT-enabled applications: software-intensive systems, complex systems and intelligent systems.

Software-intensive systems are systems, which heavily interact with other systems, sensors, actuators, devices, other software systems and users. More and more domains are involved with software-intensive systems, e.g., automotive, telecommunication systems, embedded systems in general, industrial automation systems and business applications. Moreover, the outcome of web services delivers a new platform for enabling software-intensive systems. The conference is thus focused on tools, practically relevant and theoretical foundations for engineering software-intensive systems.

Complex systems research is focused on the overall understanding of systems rather than its components. Complex systems are very much characterized by the changing environments in which they act by their multiple internal and external interactions. They evolve and adapt through internal and external dynamic interactions.

The development of intelligent systems and agents, which is each time more characterized by the use of ontologies and their logical foundations, build a fruitful impulse for both software-intensive systems and complex systems. Recent research in the field of intelligent systems, robotics, neuroscience, artificial intelligence and cognitive sciences is very important factor for the future development and innovation of software-intensive and complex systems.

This conference is aiming at delivering a forum for in-depth scientific discussions among the three communities. The papers included in the proceedings cover all aspects of theory, design and application of complex systems, intelligent systems and software-intensive systems.

We are very proud and honored to have two distinguished keynote talks by Prof. Keita Matsuo, Fukuoka Institute of Technology, Japan, and Dr. Anne Kayem, Hasso Plattner Institute, University of Potsdam, Germany, who will present their recent work and will give new insights and ideas to the conference participants.

The organization of an international conference requires the support and help of many people. A lot of people have helped and worked hard to produce a successful technical program and conference proceedings. First, we would like to thank all authors for submitting their papers, the program committee members, and the reviewers who carried out the most difficult work by carefully evaluating the submitted papers. We are grateful to Honorary Chair Prof. Makoto Takizawa, Hosei University, Japan, for his guidance and support.

Finally, we would like to thank Web Administrator Co-chairs for their excellent and timely work.

We hope you will enjoy the conference proceedings.

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CISIS-2022 Keynote Talks

Design and Implementation Issues of Omnidirectional Robots and Their Applications for Different Environments

Keita Matsuo

Fukuoka Institute of Technology, Fukuoka, Japan

Abstract. Intelligent robotic systems are becoming essential for increasing Quality of Life (QoL) and keeping health for growing population of elderly people. In our research, in order to solve human health problems and support elderly people, we consider the design and implementation of omnidirectional robots. In this talk, I will introduce our results to show how omnidirectional wheelchair robots can support people with disabilities at home and at workplace. In our work, we also consider the use of the omnidirectional wheelchair robots for playing tennis and badminton. I also will present the application of omnidirectional robot as a mesh router in Wireless Mesh Networks (WMNs) in order to provide a good communication environment.

Is Privacy the Same as Security, or Are They Just Two Sides of the Same Coin?

Anne Kayem

Hasso-Plattner-Institute, University of Potsdam, Potsdam, Germany

Abstract. Almost every digital device either generates or consumes data in some form. The result is that the volumes of data collected grow exponentially each day. Data analytics proponents have mooted that it is now possible in some cases to actually predict future human behaviors based on data collected through tracking and various other means. On the other parallel, the question of privacy has become ever more important as users increasingly seek ways of guarding their personal data from exposure. This as such raises the question of what the distinction between privacy and security (data protection) is, and what the boundary between the two should be. For instance, the 2014 incident of a hacker faking the German minister of defense's fingerprints was considered to be a security breach. However, a closer look at this issue highlights the fact that distinguishing between whether or not this was a privacy breach that enabled a security breach, or vice versa, does not have a straightforward answer. In this talk, I aim to explain why in my view privacy is different from security and, while though both privacy and security are mutually interdependent, why it is important to make the distinction. The talk will be supported by various examples to characterize privacy and distinguish it from security. At the same time, I will also explain why the two concepts are in fact two sides of the same coin.

Contents

Unnecessary Maneuvers as a Determinant of Driver Impatience in VANETs: Implementation and Evaluation of a Fuzzy-based System	1
Kevin Bylykbashi, Ermioni Qafzezi, Phudit Ampirit, Elis Kulla, and Leonard Barolli	
Performance Evaluation of a Drone-Based Data Replication Method in Urban Disaster Scenario	10
Makoto Ikeda, Seiya Sako, Masaya Azuma, Shota Uchimura, and Leonard Barolli	
A Fast Convergence RDVM for Router Placement in WMNs: Performance Comparison of FC-RDVM with RDVM by WMN-PSOHC Hybrid Intelligent System	17
Shinji Sakamoto, Admir Barolli, Yi Liu, Elis Kulla, Leonard Barolli, and Makoto Takizawa	
Energy-Efficient Two-Phase Locking Protocol by Omitting Meaningless Read and Write Methods	26
Tomoya Enokido, Dilawaer Duolikun, and Makoto Takizawa	
A New Method for Optimization of Number of Mesh Routers and Improving Cost Efficiency in Wireless Mesh Networks	37
Aoto Hirata, Tetsuya Oda, Yuki Nagai, Tomoya Yasunaga, Nobuki Saito, Kengo Katayama, and Leonard Barolli	
A Wireless Sensor Network Testbed for Monitoring a Water Reservoir Tank: Experimental Results of Delay	49
Yuki Nagai, Tetsuya Oda, Chihiro Yukawa, Kyohei Toyoshima, Tomoya Yasunaga, Aoto Hirata, and Leonard Barolli	

Remote Medical Assistance Vehicle in Covid-19 Quarantine Areas: A Case Study in Vietnam	59
Linh Thuy Thi Pham, Tan Phuc Nhan Bui, Ngoc Cam Thi Tran, Hai Thanh Nguyen, Khoi Tuan Huynh Nguyen, and Huong Hoang Luong	
Dynamic Job Allocation on Federated Cloud-HPC Environments	71
Giacomo Vitali, Alberto Scionti, Paolo Viviani, Chiara Vercellino, and Olivier Terzo	
Examination of Robot System Detecting Smoke Condition in the Event of a Fire	83
Yang Kun and Takahiro Uchiya	
A Test Bed for Evaluating Graphene Filters in Indoor Environments	94
Federico Stirano, Fabrizio Bertone, Giuseppe Caragnano, and Olivier Terzo	
An Overview of Emotion Recognition from Body Movement	105
Laleh Ebdali Takaloo, Kin Fun Li, and Kosuke Takano	
Experimental Analysis and Verification of a Multi-modal-Biometrics Identity Verification Framework Based on the Dempster-Shafer Theory	118
Alfredo Cuzzocrea, Majid Abbasi Sisara, and Carmine Gallo	
Breast Ultrasound Image Classification Using EfficientNetV2 and Shallow Neural Network Architectures	130
Hai Thanh Nguyen, Linh Ngoc Le, Trang Minh Vo, Diem Ngoc Thi Pham, and Dien Thanh Tran	
Steganographic Approaches for Carrier Related Information Hiding	143
Marek R. Ogiela and Urszula Ogiela	
A Bi-objective Genetic Algorithm for Wireless Sensor Network Optimization	147
Amit Dua, Pavel Krömer, Zbigniew J. Czech, and Tomasz Jastrzab	
104 Fruits Classification Using Transfer Learning and DenseNet201 Fine-Tuning	160
Khanh Vo Hong, Tin Tang Minh, Hoa Le Duc, Nam Truong Nhat, and Huong Luong Hoang	
Transfer Learning with Fine-Tuning on MobileNet and GRAD-CAM for Bones Abnormalities Diagnosis	171
Huong Hoang Luong, Lan Thu Thi Le, Hai Thanh Nguyen, Vinh Quoc Hua, Khang Vu Nguyen, Thinh Nguyen Phuc Bach, Tu Ngoc Anh Nguyen, and Hien Tran Quang Nguyen	

A Fuzzy-Based System for Handover in 5G Wireless Networks Considering Network Slicing Constraints	180
Phudit Ampirit, Ermioni Qafzezi, Kevin Bylykbashi, Makoto Ikeda, Keita Matsuo, and Leonard Barolli	
A Focused Beam Routing Protocol Considering Node Direction for Underwater Optical Wireless Communication in Delay Tolerant Networks	190
Keita Matsuo, Elis Kulla, and Leonard Barolli	
Taming Multi-node Accelerated Analytics: An Experience in Porting MATLAB to Scale with Python	200
Paolo Viviani, Giacomo Vitali, Davide Lengani, Alberto Scionti, Chiara Vercellino, and Olivier Terzo	
An Adaptive Resource Allocation Protocol for Dynamic Environments	211
Mojtaba Malek-Akhlagh and Jens H. Weber	
FPGA Implementation of an Object Recognition System with Low Power Consumption Using a YOLOv3-tiny-based CNN	223
Yasutoshi Araki, Masatomo Matsuda, Taito Manabe, Yoichi Ishizuka, and Yuichiro Shibata	
Achieving Sustainable Competitive Advantage Through Green Innovation; the Moderating Effect of Islamic Environmental Ethics and Islamic Business Ethics	234
Budhi Cahyono and Marno Nugroho	
Digital Social Capital and Financial Inclusion for Small Medium Enterprises	249
Mutamimah and Pungky Lela Saputri	
Knowledge Absorptive Capacity Toward Sustainable Organizational Reputation in Digital Era	260
Mulyana Mulyana and Erlinda Ramadhani Permata Putri	
The Role of Holistic Value Co-creation Capability in Improving Sustainable Relationship	269
Ken Sudarti, Wasitowati, and Ari Pranaditya	
Conceptual Paper Tax Avoidance and Firm Value in Manufacturing Companies: A Case Study for Companies in Indonesia	280
Chrisna Subendi, Luluk Muhimatul Ifada, and Winarsih	
Customer Experience Management for ICT Industry Using SEM-PLS Analysis Technique	291
Sri Safitri, Achmad Sudiro, Fatchur Rochman, and Mugiono Mugiono	

Increasing Repurchase Intention Through Personal Selling Capability, Customer Engagement, and Brand Trust	303
Alifah Ratnawati, Erma Sri Hastuti, and Noor Kholis	
E-Impulse Buying Improvement with Product Knowledge, Shopping Lifestyle, and Positive Emotion	315
Lutfi Nurcholis and Nailus Sa'adah	
Transformational Performance of Police of the Republic of Indonesia Through Smart Working	325
Siti Sumiati and Verri Dwi Prasetyo	
The Role of Tawhidic Paradigm in Knowledge Creation Process	337
Nurhidayati and Andhy Tri Adriyanto	
Islamic Human Values for Career Adaptability and Career Success of Millennial Generation	348
Ardian Adhiatma, Salsya Vivi Feronica Althof, and Meita Triantiani	
FAST: A Conceptual Framework for Reducing Fraud Financial Statement in Financial Business Practice	355
Ahmad Hijri Alfian, Verina Purnamasari, and Dian Essa Nugrahini	
Risk Management and Islamic Value: A Conceptual Development of Al-Adl Financing Risk Management	364
Jumaizi, Widiyanto bin Mislan Cokrohadisumarto, and Eliya Tuzaka	
The Consumption Value and Value Congruity: A Conceptual Development of Hasanah Value Congruity	373
Ari Pranaditya, Ken Sudarti, and Hendar	
Resilience of Companies Listed in Jakarta Islamic Index (JII) During the Pandemic COVID-19	382
Mutoharoh and Naila Najihah	
The Role of Institutional Investors in Lowering Information Asymmetry: Study on Mandatory Regulation of Integrated Reporting Implementation	393
Naila Najihah and Mutoharoh	
Application of Business Process Semantic Annotation Techniques to Perform Pattern Recognition Activities Applied to the Generalized Civic Access	404
Beniamino Di Martino, Mariangela Graziano, Luigi Colucci Cante, Antonio Esposito, and Maria Epifania	
A Semantic Representation for Public Calls Domain and Procedure: Housing Policies of Campania Region Case Study	414
Beniamino Di Martino, Mariangela Graziano, Luigi Colucci Cante, Giuseppe Ferretti, and Valeria De Oto	

Machine Learning, Big Data Analytics and Natural Language Processing Techniques with Application to Social Media Analysis for Energy Communities	425
Beniamino Di Martino, Vincenzo Bombace, Luigi Colucci Cante, Antonio Esposito, Mariangela Graziano, Gennaro Junior Pezzullo, Alberto Tofani, and Gregorio D'Agostino	
Semantic Based Knowledge Management in e-Government Document Workflows: A Case Study for Judiciary Domain in Road Accident Trials	435
Beniamino Di Martino, Luigi Colucci Cante, Salvatore D'Angelo, Antonio Esposito, Mariangela Graziano, Rosario Ammendolia, and Pietro Lupi	
Towards the Identification of Architectural Patterns in Component Diagrams Through Semantic Techniques	446
Beniamino Di Martino, Piero Migliorato, and Antonio Esposito	
A Semantic Methodology for Security Controls Verification in Public Administration Business Processes	456
Massimiliano Rak, Daniele Granata, Beniamino Di Martino, and Luigi Colucci Cante	
Software Reuse Enabled by Machine Learning Based Source Code Analysis: A Case for Automated Classification of OpenSource Software with Respect to Requirements	467
Dario Branco, Luigi Cuccaro, and Beniamino Di Martino	
Towards Machine Learning Enabled Analysis of Urban Mobility of Electric Motorbike: A Case Study for Improving Road Maintenance and Driver's Safety in La Coruna City	477
Dario Branco, Beniamino Di Martino, Salvatore Venticinque, Alberto León Fernández, and Valentin Porta	
Towards Semantic Description of Symbology and Heraldry Using Ontologies	488
Alba Amato, Giuseppe Cirillo, and Francesco Moscato	
ECListener: A Platform for Monitoring Energy Communities	498
Gregorio D'Agostino, Alberto Tofani, Vincenzo Bombace, Luigi Colucci Cante, Antonio Esposito, Mariangela Graziano, Gennaro Junior Pezzullo, and Beniamino Di Martino	
Porting of Semantically Annotated and Geo-Located Images to an Interoperability Framework	508
Alba Amato, Rocco Aversa, Dario Branco, Salvatore Venticinque, Giuseppina Renda, and Sabrina Mataluna	

Efficient Content Sharing Using Dynamic Fog in Cloud-Fog-Edge Three-Tiered Network	517
Kohei Yoshikawa and Shinji Sugawara	
Study on the Comparison of Consumer Impression of E-commerce and Real Stores in the Fashion Tech Era, and the Effectiveness of VR Utilization	528
Momoko Sakaguchi and Eiji Aoki	
Introducing Speaker Vectors for Child Speech Synthesis in Neural Vocoder	538
Satoshi Yoshida, Ken'ichi Furuya, and Hideyuki Mizuno	
Code Modification Problems for Multimedia Use in JavaScript-Based Web Client Programming	548
Khaing Hsu Wai, Nobuo Funabiki, Huiyu Qi, Yanqi Xiao, Khin Thet Mon, and Yan Watequlis Syaifudin	
Design and Implementation of an Immersive Network Collaborative Environment Using OpenPose with 360VR Camera and WebXR	557
Jingtao Xu, Wei Shi, and Yoshihiro Okada	
Dental Treatment Training System Using Haptic Device and Its User Evaluations	569
Masaki Nomi and Yoshihiro Okada	
Author Index	581



The Consumption Value and Value Congruity: A Conceptual Development of Hasanah Value Congruity

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Abstract. This paper tries to propose a new concept that combines value congruity and religiosity called *Hasanah Value Congruity (HVC)*. The concept describes as a unique capability of frontliner together as a marketing team, create a culture which congruence with the customer consumption value as a strategic asset, as customers prefer to use products and services that in line with their personal values. The values adhered in HVC is Islamic Values as the frontliner and the team's culture capable to increase the level of one's *iman (ziadatul iman capability)* and knowledge (*the love of knowledge capability*). HVC lies within the scope of internal marketing as enabling promises activity expected to increase marketing performance. Testing the validity of each dimension is needed, which can then be empirically tested with addition of service quality, internal communication and interpersonal relationship as variables.

Keywords: The Theory of Consumption Value · Value congruity · Marketing culture · *Hasanah* value congruity

1 Introduction

Internal marketing as the focus of this study based on a marketing perspective belief that satisfied and motivated employees are essential to satisfy external customers [1]. Internal marketing is an activity carried out by a company that provides excellent services [2] to internal customers, namely employees, which is an activity of "enabling promises" which is one of the three types of marketing in "The Service Marketing Triangle" [3]. "The Service Marketing Triangle" describes the interrelationship of three important elements of service organizations, namely: company, employee and customer which makes the process of marketing services divided, namely internal marketing, external marketing and interactive marketing. The interaction that the company perform to external customers, namely customers, is external marketing, in the form of "giving the promises" activities that offer quality products at competitive prices, attractive promotions and ease of obtaining products. While interactive marketing is an activity carried out by employees

to customers, namely “keeping promises” activities by providing total quality service to tangible elements, empathy, responsiveness, reliability and assurance (Fig. 1).

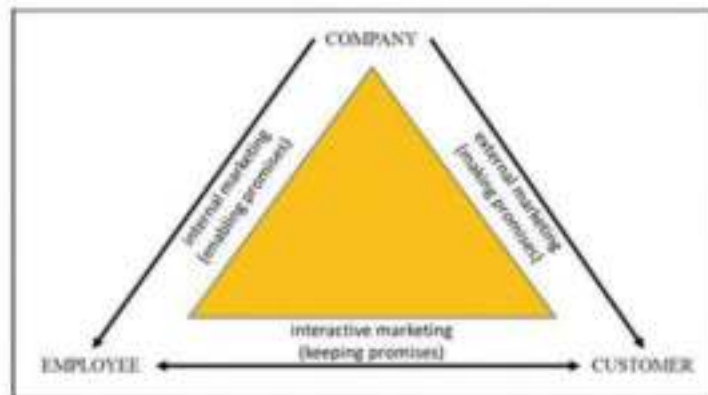


Fig. 1. The service marketing triangle [4]

Frontliners as employees in the vanguard who are directly related to customers have a very important role in creating service value in order to satisfy customers [5] because when its strategic, value can be a source of competitive advantage, whether temporary or even sustainable [6].

Values play a central role in the cognitive structure of customers, therefore values that have good congruity with customers will certainly be a superior marketing strategic asset because it explains the similarity of values between customers and organizations where customers prefer to use products and services that represent their personal values [7]. However, Bao [8] stated that the effect of value congruence on performance is complicated. Schleicher, Watt, & Greguras [9] saw the relevance of the value dimension and the context of research having a significant impact on results, which is associated with sales performance [10] but nevertheless the effect of value congruence on performance, whether in role or contextual is less often [11], while Lee, S. & Jeong, M. [7] stated that it is necessary to investigate different types of congruity.

The existence of value formed by frontliners creates a marketing culture that has been proven empirically have a considerable impact on organizational performance and profitability [12, 13] although some researchers say the relationship is short-term [14], highly problematic [15] and damaging economic performance [16].

Each dimension of value is a valuable information for marketers for their strategic initiatives [16] because it has an influence on purchasing motivation [18]. This view is supported by Yeonsoo et al. [19], who assert that the Theory of Consumption Values (TCV) allows for a deeper explanation since it examines fundamental reasons in the consumer decision-making process. Sheth et al. [20] identified five values or dimensions of value that influence consumer choices, including functional value, social value, epistemic value, emotional value and conditional value. TCV can be a strong base for marketers to build strategies for their products and services can be well accepted by consumers.

The values consider to be the driver of consumer consumption in TCV however, is only measured by worldly measurement. It does not extend to the afterlife, that is

the basic needs of Islamic values injection in the theory. As moslem's consumption motivation is not only to fulfill their worldly needs, but also as a religious procession or *ibadah*. Allah Subhanahu wa Ta'ala explains in *QS. Az Zariyat 56*: "And I (Allah) did not create jinn and mankind except worship Me."

5 values of TCV and value congruity does not explain the consideration of the value of worship. The presence of *hasanah* in value congruity becomes a *ukhrowi* dimension that perfects the value that can be felt by customers. Marketing culture that integrates *hasanah* with value congruity is expected to create *hasanah* value congruity which has the potential to improve marketing performance based on congruity theory [21] as customers prefer to use products and services that represent their personal values [7].

2 Literature Review

2.1 Congruity Theory

Congruity theory emerge when a person is more likely to have a positive attitude towards an object when a person perceives an object or phenomenon consistent with what he is holding [21]. Congruity Theory developed into a variety of concepts, one of which is value congruity, which is an interactive marketing perspective because it explains the similarity of values between customers and organizations where customers prefer to use products and services that represent their personal values [7, 22].

Value congruity first emerge as the perceived similarities between values held by individuals and organizations [23] which explain the relationship within an organization. Value congruity is supported by the similarity-attraction theory [24]. Similarity-attraction theory people prefer to maintain relationships with others similar to them. It's Zhang and Bloemer [25], the one connects value congruity in marketing between sellers and consumers.

However, congruity theory still grounded its concept on the relationship between individuals or groups with other individuals or groups and the relationship of individuals or groups with products or services in a particular context. None of them include the dimensions of the afterlife or the similarity of values nuanced to worship *Allah*.

2.2 The Theory of Consumption Value

TCV was introduced by Sheth et al. [20] in an article titled "Why we buy what we buy: A theory of consumption values" published in the *Journal of Business Research*. Sheth et al. [20] identified five values (values or dimensions of value) that influence consumer choice. Together functional value, social value, epistemic value, emotional value and conditional value represent TCV.

Functional value comes from the intrinsic capacity of a product for functional, utilitarian or physical performance, ie. its ability to fulfill the function of the product is created. Functional value is based on the assumption that customers are driven by alternatives with the best performance on their physical and utilitarian attributes or alternatives that have most of those attributes [27]. Its influence on customer choice is focused on traditional economic utility theory [26].

Social value is defined as the perceived and acquired utility of a product's relationship with a particular demographic, cultural or social group [28]. Social values are values that allow individuals to develop close relationships with a particular community or group. It is often a specific reference group or community of which the individual wants to be a part of it [26]. Emotional value is related to the aspect of extrinsic consumption in terms of the product's ability to evoke affective feelings or states. The more positive emotions that can come from a product or service, the more likely it is that customers will continue to use it [26].

Epistemic values relate to the perceived utility or acquired from an alternative capacity to arouse curiosity, provide novelty and/or satisfy the desire for special consumption knowledge or experience [29]. Then the conditional value comes from the product's ability to provide functional or social value while in a particular situation or context and consequently depends on the specific circumstances the customer faces when making conditional values choices to promote or withhold a decision [29].

TCV in its development has experience addition of dimensions, including *religious influence* [30], *monetary value* [31], *fashion value* [32], *expositional value* [33] and *religious value* [34]. The addition of *religious value* based on Faith as a key Islamic value [34] is the latest dimension in the development of TCV. However, the addition of these dimensions comes from qualitative research with 21 respondents. This opens up opportunities for the integration of Islamic values in the development of TCV which is the focus of this research.

2.3 Hasanah Value Congruity

In language/etymology, the Arabic word *hasanah* means good, beautiful, whose form of masdar *hasanatan* means goodness, grace, kindness, good deeds, privilege, virtue. Viewed in the terms of terminology, the meaning of the word *hasanah* is an act of virtue (charity) that will symbolically be placed on the scales to decide one's salvation on the day of the afterlife trial.

The meaning of *hasanah* is close to the word *mahmudah* meaning is commendable whose meaning is good, noble and so on. Mahmudah can be juxtaposed with the word *muamalah* to be *Muamalah Mahmudah* which means commendable muamalah. *Muamalah* itself is a law of syara related to world affairs and human life, such as buying and selling, trading and so on. *Muamalah* is any regulation that contains all matters relating to world affairs and every matter of matter concerning the material, marriage, and *talaq* established by following the general and detailed basics to be used as instructions for human beings in exchanging benefits. Two sources of the law on *muamalah* in the teaching of Islam are the Qur'an and the Sunnah or Hadith, which means the words, actions, and approval of the Prophet Muhammad.

According to Abdullah of Ibn Abbas, there are seven indicator for *hasanah* in the world, that is *qolbun syaakirun* means his heart is always grateful., *Al azwaju shalihah*, have godly wives, *al auladun abrar*, have children who are devoted to parents, *albiatu sholihah* means the neighborhood, friends and good neighbors, *arzaaqun mabruukah*, that is, having sufficient halal sustenance, *hubbul ilmi, ulamai wa majaalisihi*, means loving the knowledge of the Quran, As-Sunnah, scholars and its functions (*at tafaqquh fiddiin*) and *'umrun mabrukun*, his age is a blessing in obedience.

Related to the research context of higher education, *albiatu sholihah* which means the neighborhood, friends and good neighbors and *hubbul ilmi, ulamai wa majaalisih* which means loving the knowledge of the Quran, As-Sunnah, scholars and its functions (*at tafaqquh fiddiin*) will be the appropriate indicator of **Hasanah Value Congruity** which defined as the frontliner's ability to strengthen *Ziadatul Iman* Capability and the love of knowledge capability through improving customer understanding and confidence in the similarity of *hasanah* values. *Hasanah* Value Congruity has the potential to improve marketing performance.

Ziadatul Iman Capability is the ability of frontliners in strengthening faith in their environment through the values of *hasanah*. *Albiatu sholihah* formed from colleagues and leaders who have congruity of social values, emotional values and islamic values *hasanah*. The congruity of social value, namely the importance to always exist in the environment of people who are with similar *aqidah* and *sholeh* as the Prophet *shalallahu alaihi wa salam* explained that "one's follows *din* (religion; character; Morals) of one's close friend. Therefore, one's should pay attention to who he makes a close friend" HR. Abu Dāwud, no.4833; Tirmidhi, no.2378. narrated by Shaykh al-Albani in genealogy of ash-Shahihah no. 927.

The congruity of emotional value with customers is characterized by the desire to always be close to *Allah subhanahu wa ta'ala*, which is comfortable in the middle of friends who are *sholeh*. *Allah subhanahu wa ta'ala* explains who is among the people who are *sholeh* in *QS At-Taubah 112*, namely "They are those who repent, who worship, who praise, who visit, who ruku', who bow down, who command to do ma'ruf and prevent the act of munkar and who keep the laws of God. *Ziadatul iman* capability has the spirit of *fastabiqul khoirot* which is competing in goodness and reminding each other in kindness and patience.

The next dimension, **The Love of Knowledge Capability** is the frontliner's ability to strengthen the love of religious science formed from the congruence and integration of functional values, epistemic value and conditional value with Islamic values. In the context of higher education purpose as stated in UU No. 12 of 2012, namely in article 5 mentioned 4 (four) goals of higher education where the first is "The development of the potential of students to become human beings who believe and fear God Almighty and be noble, healthy, knowledgeable, capable, creative, independent, skilled, competent, and cultured for the benefit of the nation." The congruence of functional values and integration of Islamic values with the Tridharma becomes an embodiment of the purpose of higher education in accordance with Law No. 12 of 2012 above.

The congruence and integration of Islamic values with the Tridharma is expected to arouse *tafaqquh fid diin*, the spirit of understanding religious science which becomes an *epistemic value* that is to arouse curiosity, give new things or satisfy the desire for knowledge according to the order of the Prophet *shalallahu alaihi wa salam* "be you a knowledgeable person, or a person who studies, or a person who wants to listen to knowledge, or a person who likes knowledge" (Hr. Baihaqi). In addition to epistemic value, the integration of Islamic values with the Tridharma is also congruence with conditional value, providing functional or social value in certain situations or contexts, namely knowledge or *'ilm* in arabic is the only path to *hasanah*, the happiness of the afterlife.

2.4 Marketing Performance

Performance is a multidimensional concept that does not only show the measurement of results but also the process in achieving results and conditions that enable the achievement of results [35]. Marketing performance in the context of higher education is the increasing number of new students who were previously marked by the increasing number of applicants. *Patronage intention* is also an indicator of whether customers will continue to use a service or switch to another service [36] which is the intention of students to resume their next level of education, either master or doctoral degree in the same institution.

Another marketing performance indicator is word of mouth (WOM). According to Kumar, Petersen, and Leone [37], valuable customers are customers who through WOM can bring in the most profitable customers. What customers feel and what they tell others about the company/brand can affect revenue and profit [38]. Any activity involving WOM will basically be related to satisfaction and profit research. Positive WOM produces more results than negative ones. Nevertheless both have significant impact on potential customer behavior towards the company and purchase intentions [39]. Implications for higher education, excellent WOM not only has an impact on improving financial returns but also improves its image. Individuals who are satisfied and believe in higher education institutions will be willing to spread positive WOM and can easily provide recommendations to others, especially those closest to them.

Through an in-depth study, the study finally succeeded in synthesizing Islamic values, value congruity and marketing culture. *Hasanah* Value Congruity proposition can be defined as follows:

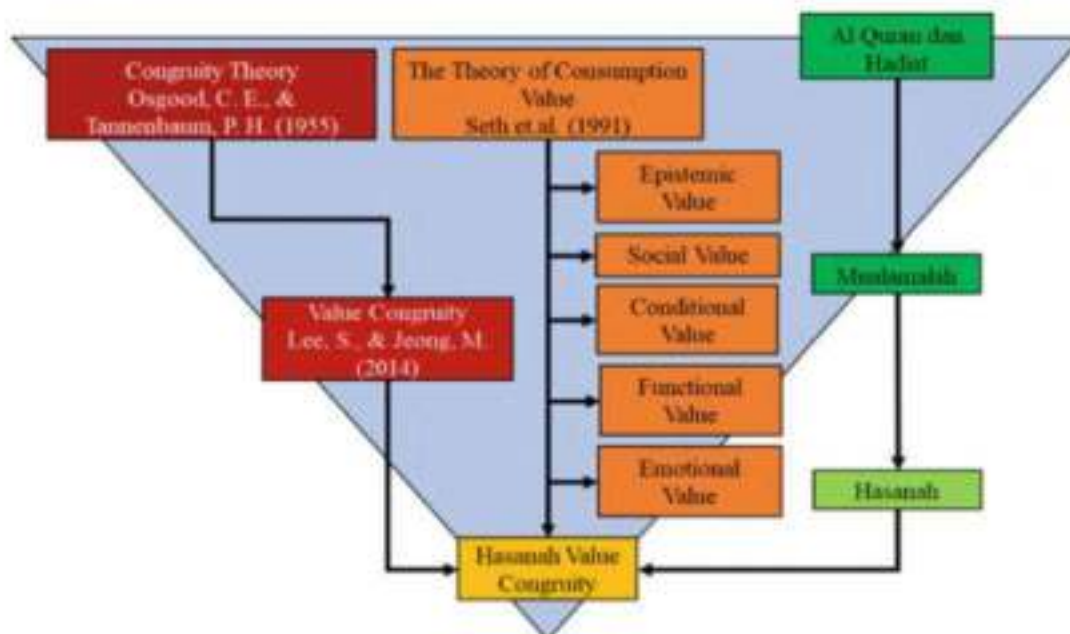


Fig. 2. The integration of *Congruity Theory* and *The Theory of Consumption Value* with *Hasanah* as Islamic Value; developed by author for the study.

Hasanah Value Congruity is the frontliner's ability to strengthen Ziadatul Iman Capability and the love of knowledge capability through improving customer understanding and confidence in the similarity of *hasanah* values. *Hasanah* Value Congruity has the potential to improve marketing performance (Fig. 2).

3 Conclusion

Hasanah Value Congruity (HVC) is an Islamic character that is thought to be able to increase marketing performance. Someone who has HVC will be able to strengthening faith in their environment through the values of *hasanah*, maintaining the team to always surround themselves in the environment of *sholeh* people with similar *aqidah* and ability to strengthen the love of religious science by arousing *tafaqquh fid diin*, the spirit of understanding religious science. In the context of higher education culture, shall each individual in a team has HVC, then the will helps everyone to understand and 'feel' the function of marketing". As the feel of marketing aroused, hopefully it will attract potential customers with similar value and affect its marketing performance.

4 Future Research

For future research agenda, it is better to involve validating the measurement of each variable and testing Hasanah Value Congruity concept at the empirical level. The type of this study is explanatory research, a research method that intends to explain the position of the variables studied and the influence between variables with each other. Antecedent variables offered are service quality, internal communication and interpersonal relationship referring to Webster's [40] opinion as a widely accepted and implemented instrument for measuring marketing culture [41]. These variables are expected to be able to increase marketing performance. This model is very precisely tested in Islamic higher education institution in Central Java area of Indonesia, which expected to have already integrate Islamic values in its curriculum and management. Random samples collected from academic member of the Islamic higher education institutions responsible for marketing activities. The simple random sampling technique chosen due to the members of the population are considered homogeneous, without seeing and paying attention to the similarities or strata that exist in the population.

Data collection is carried out by the dissemination of questionnaires, direct data collection carried out by submitting a list of statements to respondents. The questionnaire is submitted directly through online media in the form of google form. Statements include open and closed, an open statement is a statement that gives freedom to respondents to answer statements in accordance with their way of thinking. While a closed statement is a statement where the answers have been limited by researchers so that it is possible for respondents to answer at length according to their way of thinking.

To process the data in this study used the Structural Equation Modelling (SEM) of the AMOS 20.0 software package. SEM is a set of statistical techniques that allow simultaneous testing of a series of relatively complex relationships. SEM is a combination of separate statistical methods, namely factor analysis and simultaneous equation modeling.

References

1. Lings, I.N., Greenley, G.E.: The impact of internal and external market orientations on firm performance. *J. Strateg. Mark.* **17**(1), 41–53 (2009)
2. Shiu, Y.M., Yu, T.W.: Internal marketing, organisational culture, job satisfaction, and organisational performance in non-life insurance. *Serv. Ind. J.* **30**(6), 793–809 (2010)
3. Gronroos, C.: *Service Management and Marketing: A Customer Relationship Management Approach*. John Wiley and Sons, Ltd., Hoboken (2000)
4. Zeithaml, V.A., Bitner, M.J., Gremler, D.D.: *Services Marketing Strategy*, Wiley International Encyclopedia of Marketing, December 2017
5. Heskett, J.L., Jones, T.O., Loveman, G.W., et al.: Putting the service-profit chain to work. *Harv. Bus. Rev.* **72**, 164–170 (1994)
6. Barney, J.B.: Firm Resources and Sustained Competitive Advantage. *J. Manage.* **17**, 99–120 (1991)
7. Lee, S., Jeong, M.: Enhancing online brand experiences: an application of congruity theory. *Int. J. Hosp. Manag.* **40**, 49–58 (2014)
8. Bao, Y., Dolan, S.L., Tzafrir, S.S.: Value Congruence in Organizations: Literature Review, Theoretical Perspectives, and Future Directions (2012). ESADE Business School Research Paper 239 (2012)
9. Schleicher, D.J., Watt, J.D., Greguras, G.J.: Reexamining the job satisfaction-performance relationship: the complexity of attitudes. *J. Appl. Psychol.* **89**(1), 165–177 (2004)
10. Weeks, W.A., Chonko, L.B., Kahle, L.R.: Performance congruence and value congruence impact on sales force annual sales. *JAMS* **17**, 345–351 (1989)
11. Arthur, W., Jr., Bell, S.T., Villado, A.J., Doverspike, D.: The use of person-organization fit in employment decision making: an assessment of its criterion-related validity. *J. Appl. Psychol.* **91**(4), 786–801 (2006)
12. Biloslavo, R., Trnavcevic, A.: Marketing culture as a tool for development of a sustainable organization. In: *International Conference on Business Management and Economics (ICBME 2011)*, Yasar University, Izmir, Cesme, 6–8 October 2011
13. Postruznik, N., Moretti, M.: Innovation and communication as dimensions of the marketing culture: their influence on financial performance in Slovenia's insurance and construction industries. *Our Econ.* **58**(1/2), 35–47 (2012)
14. Kotter, J.P., Heskett, J.L.: *Corporate Culture and Performance*. Free Press, New York (1992)
15. Alvesson, M., Berg, P.O.: *Corporate Culture and Organizational Symbolism: An Overview*. Walter de Gruyter, Berlin (1992)
16. Kotter, J.P., Schlesinger, L.A.: Choosing Strategies for Change. *Harvard Bus. Rev.* **86**(7–8) (2008)
17. Whalen, K.A.: Three circular business models that extend product value and their contribution to resource efficiency. *J. Clean. Prod.* **226**, 1128–1137 (2019)
18. Ramkissoon, H., Nunkoo, R., Gursoy, G.: How consumption values affect destination image formation. In: Woodside, A.G., Megehee, C.M., Ogle, A. (eds.) *Perspectives on Cross-Cultural, Ethnographic, Brand Image, Storytelling, Unconscious Needs, and Hospitality Guest Research (Advances in Culture, Tourism and Hospitality Research Volume 3)*, pp. 143–168. Emerald Group Publishing Limited, Bingley (2009)
19. Yeonsoo, L., Jinwoo, K., Inseong, L., Hoyong, K.: A cross-cultural study on the value structure of mobile internet usages: comparison between Korea and Japan. *J. Electron. Commer. Res.* **3**(4), 227–239 (2002)
20. Sheth, J.N., Newman, B.L., Gross, B.L.: Why we buy what we buy: a theory of consumption values. *J. Bus. Res.* **22**(2), 159–170 (1991)

21. Osgood, C., Tannenbaum, P.: The principle of congruity in the prediction of attitude change. *Psychol. Rev.* **62**, 42–55 (1955)
22. Wang, J.J., Zhang, C.: The impact of value congruence on marketing channel relationship. *Ind. Mark. Manage.* **62**, 118–127 (2017)
23. Chatman, J.A.: Matching people and organizations: selection and socialization in public accounting firms. In: *Academy of Management Proceedings*. Academy of Management, pp. 199–203 (1989)
24. Byrne, D.: *The attraction paradigm*. Academic Press, New York (1971)
25. Zhang, J., Bloemer, J.M.: The impact of value congruence on consumer-service brand relationship. *J. Serv. Res.* **11**(2), 161–178 (2008)
26. Goh, T.T., Suki, N.M., Fam, K.: Exploring a consumption value model for Islamic mobile banking adoption. *J. Islam. Mark.* **5**(3), 344–365 (2014)
27. Tapachai, N., Waryszak, R.: An examination of the role of beneficial image in tourist destination selection. *J. Travel Res.* **39**(1), 37–44 (2000)
28. Phau, L., Quintal, V., Shanka, T.: Examining a consumption values theory approach of young tourists toward destination choice intentions. *Int. J. Culture, Tour. Hospital. Res.* **8**(2), 125–139 (2014). <https://doi.org/10.1108/ijcthr-12-2012-0090>
29. Hung, C., Hsieh, C.: Searching the fit pattern between cultural dimensions and consumption values of mobile commerce in Taiwan. *Asia Pac. Manag. Rev.* **15**(2), 147–165 (2010)
30. Delener, N.: Religious contrasts in consumer decision behaviour patterns: their dimensions and marketing implications. *Eur. J. Mark.* **28**(5), 36–53 (1994)
31. Park, B.-W., Lee, K.C.: An empirical analysis of online gamers' perceptions of game items: modified theory of consumption values approach. *Cyberpsychol. Behav. Soc. Netw.* **14**(7–8), 453–459 (2011)
32. Yang, H.-L., Lin, R.-X.: Determinants of the intention to continue use of SoLoMo services: Consumption values and the moderating effects of overloads. *Comput. Hum. Behav.* **73**, 583–595 (2017)
33. Hedman, J., Bødker, M., Gimpel, G., Damsgaard, J.: Translating evolving technology use into user stories: Technology life narratives of consumer technology use. *Inf. Syst. J.* **29**(6), 1178–1200 (2019)
34. Rodrigo, P., Turnbull, S.: Halal holidays: How is value perceived by Muslim tourists? *Int. J. Tour. Res.* **21**(5), 675–692 (2019)
35. da Gama, A.P.: An expanded model of marketing performance. *Mark. Intell. Plan.* **29**(7), 643–661 (2011)
36. Zeithaml, V., Berry, L., Parasuraman, A.: The behavioral consequences of service quality. *J. Mark.* **60**, 31–46 (1996)
37. Kumar, V., Petersen, J.A., Leone, R.P.: How valuable is word of mouth? *Harvard Bus. Rev.* **85**(10), 139–146+166 (2007)
38. Reichheld, F.F.: The one number you need to grow. *Harv. Bus. Rev.* **81**, 46–54 (2003)
39. Söderlund, M., Rosengren, S.: Receiving word-of-mouth from the service customer: an emotion-based effectiveness assessment. *J. Retail. Consum. Serv.* **14**, 123–136 (2007)
40. Webster, C.: Toward the measurement of the marketing culture of a service firm. *J. Bus. Res.* **21**(4), 345–362 (1990)
41. Akroush, M.N., Al-Mohammad, S.M., Odetallah, A.L.: A multidimensional model of marketing culture and performance: a different approach to the use of Webster's marketing culture measurement scale. *Int. J. Contemp. Hosp. Manag.* **27**(7), 1442–1478 (2015)