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# Indice

<b><i>Introduction</i></b>	pag. IV
<b><i>Section I: Short papers</i></b>	
Albanese Antonietta, Bocci Elena, Varvaro Leonardo <b><i>Intergenerationality, interculture and environment for sustainable tourism</i></b>	« 1
Albergo Francesco, Anna Roberta Gagliardi <b><i>The activity-based costing approach for improved healthcare quality: a fascinating case study</i></b>	« 14
Augello Rosanna <b><i>The Carta della Natura's contribution to the analysis of pressure on coastal habitat</i></b>	« 20
Bianco Adele <b><i>Outer space and the future of sustainability</i></b>	« 32
Bologna Emanuela, Castagnaro Cinzia, Di Biagio Lorenzo, Musci Marina <b><i>Yesterday and today: changes in elderly lifestyle</i></b>	« 41
Bova Demetrio Miloslavo <b><i>The non-moral neutrality of the BES indicators framework</i></b>	« 52
Buscemi Simona, Finocchiaro Giovanni, Massaccesi Carlo <b><i>Mediterranean countries vs the other EU countries: a comparison between the European Green Deal three macro dimensions</i></b>	« 69
Celardo Luigi, Misuraca Michelangelo, Spano Maria <b><i>Spatial sentiment analysis of tourist points of interest</i></b>	« 82
Chaparro-Benegas Nuria, Mas-Tur Alicia, Maggino Filomena, Roig-Tierno Norat <b><i>Unleashing potential: how do innovation shape subjective and objective well-being?</i></b>	« 93
Colapinto Filippo <b><i>Policy lines for the development of sustainable infrastructures and mobility systems. How to guarantee effective protection to the "Do not significant harm" principle (DNSH)</i></b>	« 104
Conforto Giulia <b><i>Socio-economic and environmental determinants of women's reproductive health. Italian research into the reason why couples choose not to have children</i></b>	« 116
Congedo Luca, Amodio Angelo, Arino Olivier, De Pasquale Vito, Di Lauro Paola,	

Faucqueur Loïc, Haouet Sadri, Masse Antoine, Truffier Amaury, Munafò Michele <b><i>Soil sealing monitoring of the Mediterranean coast: presenting Ulysses, a new service based on Earth observation</i></b>	« 125
Conigliaro Paola, di Patrizio Francesca, Serusi Rita <b><i>Le rotte del Mediterraneo: ponti o fossati? Vulnerabilità nelle migrazioni: il caso dei minori migranti non accompagnati</i></b>	« 135
Corsi Vincenzo, Speranza Sabrina <b><i>Povertà, alimentazione, comunicazione</i></b>	« 147
Corvo Paolo <b><i>The new food</i></b>	« 162
Crotta Marco <b><i>Smart contracts, an emerging technology society can benefit from</i></b>	« 169
Curci Giuseppe <b><i>Disability and social inclusion: a perspective on the importance of equality and accessibility</i></b>	« 178
D'Uggento Angela Maria, Antonicelli Margaret, Marin Claudia <b><i>Healthcare migrations: analysis of essential assistance level through a Gaussian mixture model</i></b>	« 186
De Pascale Gianluigi, Romagno Anna <b><i>Globalization and ICTs capital endowment: how do they impact on an inclusive green growth index?</i></b>	« 194
Del Gobbo Emiliano, Nigri Andrea, Cafarelli Barbara <b><i>Students attitude towards online learning during Covid-19</i></b>	« 206
di Francesco Gabriele, Facioni Carolina <b><i>Can we imagine future war scenarios in the Mediterranean area?</i></b>	« 216
Facioni Carolina, Corazziari Isabella <b><i>The Italian demographic crisis in a futures studies approach</i></b>	« 222
Facioni Carolina, di Francesco Gabriele <b><i>Food: a tool for quality of life in a SDGs approach</i></b>	« 237
Finocchiaro Giovanni <b><i>The environmental dimension of tourism sustainability and its measurement. Something is finally moving!</i></b>	« 244
Fullone Flora, Farina Gianmarco, Compagnone Enza, Morrone Mirella <b><i>Timber supply chain used in industrial production of semi-finished wood products</i></b>	
Gagliardi Anna Roberta, Albergo Francesco <b><i>Digital technologies in academic entrepreneurship: requirements, applications, and challenges</i></b>	« 262
Gerbasì Elisa, Mastrorocco Ilaria, Rubino Michele <b><i>Exploring the determinants for the adoption of human rights policy</i></b>	« 269
Grassia Maria Gabriella, Marino Marina, Mazza Rocco, Paterno Anna, Stavolo Agostino <b><i>Tourism in older population: an analysis of TripAdvisor reviews</i></b>	« 281
Koloszko-Chomentowska Zofia, Spada Alessia, Fiore Mariantonietta <b><i>Development of rural peripheral areas in Poland</i></b>	« 292

Lecardane Giuseppe, Fullone Flora, Carbonara Monica	
<b><i>The multidimensional measurement of environmental quality in Italy</i></b>	« 304
Lecardane Giuseppe	
<b><i>Exploratory analysis of statistical information services with Rasch method</i></b>	« 315
Martemucci Alessandro	
<b><i>Is thriving in times of crisis and uncertainty possible? Yes with frugal management</i></b>	« 325
Mascolo Davide, Plini Leonardo, Antonicelli Margaret	
<b><i>Modular neural networks for detection and classification of brain cancer images</i></b>	« 331
Massotti Maria Costanza	
<b><i>The long stay of young women with the family: the role of social services</i></b>	« 344
Mastrorocco Ilaria, Gerbasi Elisa, Rubino Michele	
<b><i>Diversity and inclusion of workspaces: evidence from the European companies</i></b>	« 355
Matteuzzi Costanza	
<b><i>Law in the digital world</i></b>	« 367
Mesaroli Rodolfo	
<b><i>The quality of life in the migratory path of unaccompanied foreign minors: horizon or perspective?</i></b>	« 377
Metastasio Renata, Bocci Elena, Passafaro Paola	
<b><i>Communicating sustainable tourism in key of social representations: a pilot study on Instagram, Facebook and Twitter</i></b>	« 384
Nigri Andrea, Cafarelli Barbara, and del Gobbo Emiliano	
<b><i>A Review on Machine Learning-based frameworks for population changes modeling</i></b>	« 397
Papavero Mario	
<b><i>Climate change and the Italian constitution: the origin of a revolution</i></b>	« 403
Paterno Anna, Tafuri Silvio, Grassia Gabriella Maria, Pace Roberta, Carella Maria, Garcia-Pereiro Thais, Mazza Rocco	
<b><i>Inequalities in health among migrants. A bibliometric approach for knowledge-based policy recommendations</i></b>	« 414
Perchinunno Paola, Crocetta Corrado, Massari Antonella, L'Abbate Samuela	
<b><i>Spatial statistical model for the analysis of poverty in urban areas</i></b>	« 424
Perchinunno Paola, Passaro Pierluigi, Romanazzi Patrizia, Rotondo Francesco, L'Abbate Samuela	
<b><i>Digital innovation in public administration: statistical analysis for the governance support</i></b>	« 434
Plini Leonardo, Mascolo Davide	
<b><i>Machine learning techniques for hydroponic cultures</i></b>	« 445
Rubino Michele	
<b><i>Do corporate governance characteristics affect respect for human rights?</i></b>	« 456
Russo Michele	
<b><i>Nutrition, food and well-being: an insight into the use of anglicisms in</i></b>	

<b>Italian</b>	« 471
Taddeo Ernesto, Lippolis Stella, Rubino Michele	
<b><i>The impact of human rights on firms' market capitalisation</i></b>	« 482
Tarantino Alma Lucia Giuseppina	
<b><i>Participatory landscape</i></b>	« 497
Tomaselli Venera, Giammanco Maria Daniela, Cantone Giulio Giacomo, Zhang Shan, Guizzardi Andrea	
<b><i>Sustainable tourism indicators and sustainable development goals of 2030 Agenda: a mapping</i></b>	« 505
Ungaro Felice, Ricciardelli Alessandra, Antonicelli Margaret	
<b><i>LifeScience hub and the impacts on the well-being of people. A case study from the region of Apulia</i></b>	« 516
Urbani Sofia	
<b><i>Perceptions of well-being through food: construction of an indicator through data collected by questionnaire</i></b>	« 530
«530	
Urbani Sofia, Antonicelli Margaret, Maggino Filomena	
<b><i>Territorial inequalities in health: a review of main theoretical framework applied in social statistic</i></b>	« 539
Vaccargiu Eraldo	
<b><i>From the Anthropocene to the Digitocene</i></b>	« 548
Varraso Isabella, Labianca Marilena	
<b><i>Climate change, sustainability and socio-economic impacts in the EU</i></b>	« 558
Zavarrone Emma, Friel Martha, Ottaviani Vittorio	
<b><i>Promoting equality and inclusion: a MIMIC model for assessing sustainable tourism and cultural experiences for people with disabilities in Italian museums</i></b>	« 566
<b>Section II Abstracts</b>	« 576
Adamashvili Nino, Maschio Maria Rosaria, Fiore Mariantonietta, Spada Alessia, Tricase Caterina	
<b><i>Beyond the Bottle: Examining Consumers' Wine Purchasing Behavior in the Context of Information Availability and Blockchain Technology under the Project RIPARTI</i></b>	« 577
Agnusdei Giulio Paolo, Cappello Claudia, Miglietta Pier Paolo, De Iaco Sandra	
<b><i>The Impact of Tourism on Municipal Solid Waste Generation: The Case of Salento</i></b>	« 578
Angelone Raffaele, Marletta Andrea, Mariani Paolo, Zenga Mariangela	
<b><i>Sustainability paths: a reading through the opinions of Italians</i></b>	« 580
Baldazzi Barbara, Di Biagio Lorenzo, Ungaro Paola, Violante Alberto	
<b><i>Towards the SDGs: distances and inequalities</i></b>	« 581
Bergantino Angela Stefania, Buongiorno Alessandro, Intini Mario	
<b><i>Overtourism: when tourism becomes unsustainable</i></b>	« 582
Carrera Letizia	
<b><i>Proximity stores and spontaneous active inclusion strategies</i></b>	« 584

Coluccia Benedetta, Porrini Donatella <i>A regional analysis of Italian well-being within the framework of social related SDGs</i>	« 586
Corsi Marcella, Sciascia Chiara, D'Ippoliti Carlo <i>Class and Gender: Income inequality in the Eurozone</i>	« 587
Della Queva Stefania, Nicosia Manuela, Stoppiello Sabrina <i>Social innovation and official statistics: from the concept to the data analysis</i>	« 589
Della Queva Stefania, Nicosia Manuela, Stoppiello Sabrina <i>Supporting local community: the engagement of nonprofit sector in southern inner areas</i>	« 590
Di Bella Enrico <i>An overview of sustainable tourism indicators</i>	« 591
Equatore Elena, D'Uggento Angela Maria, Brescia Irene, Principi Maria Beatrice <i>Measuring patients' quality of life through self-perception</i>	« 592
Gucciardo Gaetano <i>A municipal-level sample survey on subjective well-being. Indications emerging from the case of Agrigento</i>	« 593
Gurashi Romina <i>Il welfare sostenibile e la rotta del Mediterraneo: sfide e criticità</i>	« 595
Iannuzzi Ilaria <i>Capitalism and pandemic: what prospects for the Mediterranean's social order?</i>	« 596
Laretto Enza, Plata Emanuele <i>Risultati delle tre edizioni del Premio Bezzo: la valutazione partecipata Licet - BES</i>	« 597
Liberati Paolo, Resce Giuliano, Tosi Francesca <i>The probability of multidimensional poverty: a new approach and an empirical application to EU-SILC data</i>	« 599
Nonnis William <i>Blockchain: between opportunities and challenges</i>	« 601
Orrico Alessia, D'Uggento Angela Maria, Ribeco Nunziata <i>Perception of donation among young people</i>	« 603
Pace Roberta, Bruzzone Silvia, Maccheroni Carlo, Mignolli Nadia <i>A pioneering study on non-nationals residing in Italy through the processing of ad hoc life tables</i>	« 604
Palmitessa Nadia <i>Secondary victimization in cases of domestic violence</i>	« 605
Perretta Maria Giovanna <i>The analysis of the individual's skills: the Italian case</i>	« 606
Piscitelli Alfonso, Staiano Michele <i>Understanding specific factors affecting migrants' self-assessment of living in Italy</i>	« 608
Posa Michele, De Turi Ivano, Antonicelli Margaret <i>Can a fruitful innovation ecosystem generate better economic performance in Academic Spin-Offs?</i>	« 609
Renzi Pietro, Franci Alberto <i>Assessment of the quality of care for the elderly: two services compared</i>	« 611
Strebelle Edouard, Aversa Dario, Galatic Antonino and Fiore Mariantonietta <i>Reuse of treated wastewater in the dairy industry in France, and comparison</i>	

<i>with other countries</i>	« 612
Symeonidou Antonia, Fiore Mariantonietta, Audiello Danilo, Fedele Colantuono, Burnard Pamela	
<i>Higher Education creative pedagogies: evidencing perceived impact on lifelong learning from the Creative Learning 4 Bioeconomy (CL4bio) Erasmus project</i>	« 614
Tonucci Lucia	
<i>Sea State of Health. Techno-scientific Analysis of the Plastic Pollution</i>	« 616
Paola Ungaro	
<i>Responsible production and consumption in 2030 Agenda for Sustainable Development</i>	« 617



# Promoting Equality and Inclusion: A MIMIC Model for Assessing Sustainable Tourism and Cultural Experiences for People with Disabilities in Italian Museums

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**Abstract:** Addressing tourism for all and cultural tourism for people with disabilities is crucial for promoting equality, strengthening the tourism industry, improving the quality of life for people with disabilities, and meeting legal requirements. Around 1.3 billion individuals worldwide experience significant disability, with 5.8% being children and adolescents aged 0-14. Ensuring access to travel and tourism is a fundamental right for all individuals, regardless of their abilities. Promoting more inclusive and accessible tourism experiences can achieve equality and social inclusion for people with disabilities. Cultural tourism, a vital sector of the global tourism market, can improve the quality of life for people with disabilities by facilitating social interaction, community engagement, and personal growth. Cultural tourism can also promote intercultural understanding by providing opportunities for people from different backgrounds to learn about each other's cultures and traditions. Research on children and their families with disabilities is particularly neglected in tourism. The demands and perspectives of this audience and its families still need to be explored at all levels. Significant challenges such as access to travel and tourism opportunities, such as physical barriers, limited access to

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information, insufficient training of tourism service providers, and negative attitudes towards disability characterize this sustainable tourism line. This exploratory study focuses on a systematic sample of 300 Italian museums. It proposes a MIMIC model for measuring the impact of sustainable tourism based on the analysis of the links between the satisfaction of visitors and their accessibility to the museum.

**Keywords:** Mimic, sustainable tourism, accessibility, missing values.

## 1. Background and literature review

The scholarly literature on disability and tourism has significantly expanded recently, delving into multiple facets of this subject. Some studies have looked at the issue from a commercial angle, viewing individuals with disabilities as consumers and exploring their underutilized potential as an untapped market segment [12; 17]. However, numerous investigations have adopted a different stance, exploring the hurdles that individuals with disabilities encounter while touring, such as physical, sensory, cognitive, attitudinal, and social obstacles [3;4;5;18]. These studies have deeply examined the experiences of people with disabilities looking at different tourist services like transportation [2] hospitality [13; 22], and experiences [6] while distinguishing among different types of disabilities. Subsequent research has looked at potential solutions to these obstacles, such as creating accessible tourist infrastructure, accessible information and communication technologies [8; 19] and training tourism professionals about disability awareness and accessibility [16; 1] .

For instance, [29] analyzed the issues arising from how information is delivered to these travelers. Increasing emphasis has been placed on the direct participation of disabled individuals in designing and implementing accessible tourism initiatives. This couples with the need for collaboration amongst the tourism industry, disability groups, and government agencies to foster accessible and inclusive tourism [10] and to ensure full participation and enjoyment of travel experiences by individuals with disabilities. Several studies have recognized the importance of policies and regulations in promoting accessible tourism [25]. Government bodies and national tourism organizations can play a critical role in setting accessibility standards and guidelines, providing funding for accessible infrastructure and services, and enforcing accessibility requirements, including information [7; 28]. By focus-

ing specifically on cultural tourism, the literature has emphasized making cultural sites and destinations more inclusive and accessible for people with disabilities [21; 9].

This includes addressing physical barriers and ensuring digital content is accessible through subtitles, audio descriptions, and strategic use of the latest technology and applications [24]. The literature further underscores the importance of directly involving people with disabilities in designing and developing cultural tourism experiences. This can range from co-creating museum exhibits to their involvement in planning and implementing cultural festivals. However, a significant challenge is the need for more awareness and training among tourism and culture professionals [16]. Children with disabilities are particularly vulnerable in tourism, especially cultural tourism [31; 29]. They face substantial barriers to accessing cultural sites and experiences, including physical and social obstacles. These children's and their families' needs have been largely under-studied [31; 29]. From a practical perspective, existing literature has explored two main approaches to creating more inclusive and accessible cultural experiences.

The first involves multisensory exhibits [26], while the second involves participatory museum practices. However, many of these studies primarily concern adults, leaving children with disabilities largely ignored. In the context of Italy, a world-renowned cultural tourism destination, this research aims to understand how museums cater to visitors with disabilities, considering their unique characteristics.

Specifically, since the propensity of a museum towards inclusion is a dimension that is difficult to measure directly and has been little explored in the literature, the paper intends to propose a new model (Fig.1) to evaluate the propensity towards inclusion and sustainability of museums (SIM, in the circle) as results both accessibility, adequacy (causes in the squared boxes) and satisfaction (indicators, squared boxes).

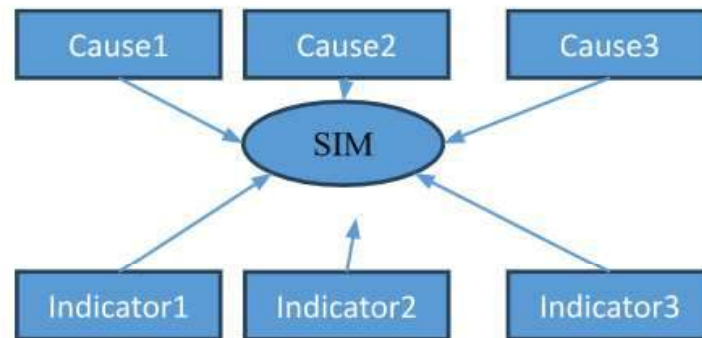


Figure 1 – Theoretical model

## 2. Data and methodology

To address our research questions, a systematic sample of 300 museums was planned with a sampling interval equal 2 involving a population of 600 Italian museums from large cities and small towns. The survey was conducted through the CAWI method during the 2022 F@Mu National Day of Families, a one-day event held annually in Italy. The event aims to provide activities for families with pre-school or primary school children. The questionnaire comprises 36 closed and semi-structured questions about the preparation of museums to welcome visitors with disabilities and families with children with disabilities, including information on the museum's name, ownership, geographic location, accessibility, and staff skills.

More specifically, the list of questions was selected to gather information on:

Name, ownership, and geographical location of the museum.

Preparation of spaces and presence of specific services for welcoming people with disabilities and self-assessment of the accessibility of the museum.

Staff skills on disability issues and willingness to undertake/organize specific training courses.

Table 1 displays the descriptive statistics on overall sample for the selected items after handling the missing values with R package mice [33], enabling the imputation of missing values with plausible data values. The reasonable values are sampled from a distribution that is precisely tailored for each missing data item. The first 13 items compose the test battery (Cronbach's 'alpha equals 0.84) related to the satisfaction of the experience at the museum. All the battery' items were measured on an anchored five-point scale. The ordinal item *dis* describes the presence of

support facilities for disabled persons from 5 not present to 1 available for all types of disabilities. Last two items reflect the overall accessibility and personnel preparedness levels of adequacy. The tactile paths (item G) reflect a heterogeneous evaluation demonstrating that this type of accessible infrastructure dedicated to visually impaired people is seen as relevant by a still limited number of museum operators. On the contrary, items F and N received a good evaluation characterised by low variabilities, such as item ADT6.

Items	Median	Mean	Std.dev
A. Signage	3.00	3.36	1.04
B. Captions	4.00	3.64	1.10
C. Paper Informative Material	4.00	3.54	1.17
D. Sensorial-based Informative Material	3.00	2.88	1.42
E. Settings	4.00	3.89	1.02
F. Visit Itinerary	4.00	3.99	0.98
G. Tactile Paths	3.00	2.97	1.45
H. Lightings	4.00	3.49	1.20
I. Resting Areas	3.00	3.21	1.28
L. Staff Preparedness	4.00	3.91	1.15
M. Restaurant/Cafeteria Service	3.00	3.05	1.45
N. Reception and Ticketing Services	4.00	4.11	1.04
O. Bookshop	4.00	3.63	1.22
dis	4.00	<i>Not adm.</i>	<i>Not adm.</i>
ADS16 – Adequacy of Staff in welcoming disabled people	4.00	3.43	1.05
ADT6 – Adequacy of Accessibility	3.00	3.34	0.96

Table 1 – Main descriptive statistics for the selected items

The propensity towards inclusion in a museum is a dimension that is difficult to measure directly, and little explored in the literature. This condition allows the application of a well-known class of model the field covariance structures. The covariance structures [14] enable the estimation of correlations between observed and latent variables and between latent variables using an equations' system. In the first case, we speak of a measurement model; in the second, we refer to a structural model. The Multiple Indicators and Multiple Causes (MIMIC) is a variant of the covariance structures. It enables the specification of statistical relationships between observed causal variables and unobserved latent variables, subsequently in-

directly influencing a group of observed indicators. The MIMIC model, first proposed by [15] and further developed by [20], incorporates latent variable(s) that are measured by multiple indicators while simultaneously being influenced by observed variables. Model fit was assessed for the measurement and MIMIC models using several criteria. The comparative fit index (CFI), Tucker-Lewis Index (TLI), and root mean square error of approximation (RMSEA) are fitting measures that are not influenced by sample size. According to [11], values over 0.95 for both CFI and TLI imply a high level of fit, and a Root Mean Square Error of Approximation (RMSEA) score below 0.05 indicates a satisfactory model fit. The construction of the MIMIC model is a consequence of the identification of the factor structure on the set of indicators; therefore, before applying the model, it will be necessary to carry out in order the explorative factor analysis (EFA), the confirmative one (CFA) and finally test the hypothesized model. The data administration and preliminary descriptive analysis were conducted using R (Version 3.6.2; R Core Team, 2019) and other R-packages, such as psych [23] and lavaan [25].

### 3. Results

To evaluate the MIMIC model, we employed a split-half sampling strategy in a random manner. The initial subsample, K ( $n_K=150$ ), was utilised to explore the factor structure. The subsequent subsample, J ( $n_J=150$ ), validated the confirmatory factor analysis (CFA) and MIMIC model. The correlation matrix for subsample K is characterized by a lack of discordant values and the lowest correlation value is equal to 0.29 between M and N items whilst the highest correlation values with H item. Figure 2a shows the path diagram for EFA only on the items belonging to the battery because the items represent the reflective parts of the MIMIC model. EFA results have been characterized by the standardized factor loadings higher than 0.5, as [31] suggest for a small sample size. The proportion of explained variance equals 0.59, and the correlation of (regression) scores with factors equals 0.95; these values denote the latent character of a sustainable, inclusive museum (SIM). This exploratory factorial structure has been tested in the subsample J, but two variables have been dropped in the final model. The CFA fit indices: CFI=0.996, RMSEA= 0.038, and SRMR=0.048 highlight a good model (Figure 2b). Even on J, we tested the MIMIC model using three new variables as causes: the former two related adequacy levels (ADS16 and ADS6) and the latter one to the presence of support facilities for disabled people (dis). The MIMIC model has been obtained

with the weighted least squares mean (WLSM) estimator because the nature of dis is ordinal. Finally, Figure 2c shows that the MIMIC model path diagram is characterized by three cause variables and three indicator variables with satisfactory fit indices: CFI=1.000, RMSEA= 0.000 and SRMR=0.041. The overall adequacy related to accessibility and the presence of facilities for people with disabilities makes up the propensity to the sustainability and inclusiveness of museums that reflect (or impacts or conditions) the three aspects F-I-H.

#### **4. Results**

The theme of accessibility and inclusion of all visitors is a central aspect for museums to pursue their mission adequately. Being accessible to all audiences can also be considered an element of sustainability of museums which, by improving their inclusiveness directly and indirectly, also contribute to SDGs and to goals 4, 10 and 11. Therefore, our work proposes a model to assess the propensity toward inclusion.

The results initially obtained show that six items explain the presence of the latent variable of the propensity toward inclusion and sustainability of museums (SIM) and that the items in which the latter is most reflected are E and F, i.e. Settings and Visit Itinerary; of these six items, the confirmatory factor analysis (CFA) confirms four, i.e. the Settings, the Visit Itinerary, Lightings, and the Resting Areas.

Finally, the MIMIC model reveals that the overall adequacy related to accessibility and the presence of facilities for people with disabilities makes up the propensity to the sustainability and inclusiveness of museums that reflects the three aspects of Visit Itinerary, Lightings, Resting Areas. These results seem to indicate that museums that have well-prepared staff to welcome and manage visitors with disabilities and that have good physical accessibility to spaces prefer to invest in three aspects that are particularly important for museums and their usability, such as the visit, lighting, and stopping points, all elements considered by the sector literature as important for full accessibility to a vast public. The absence of the item linked to personnel preparation - another factor recognized as strategic - must be read since this aspect is already given in the model (ADS16), as well as the absence of architectural barriers and the presence of services dedicated to people with disabilities.

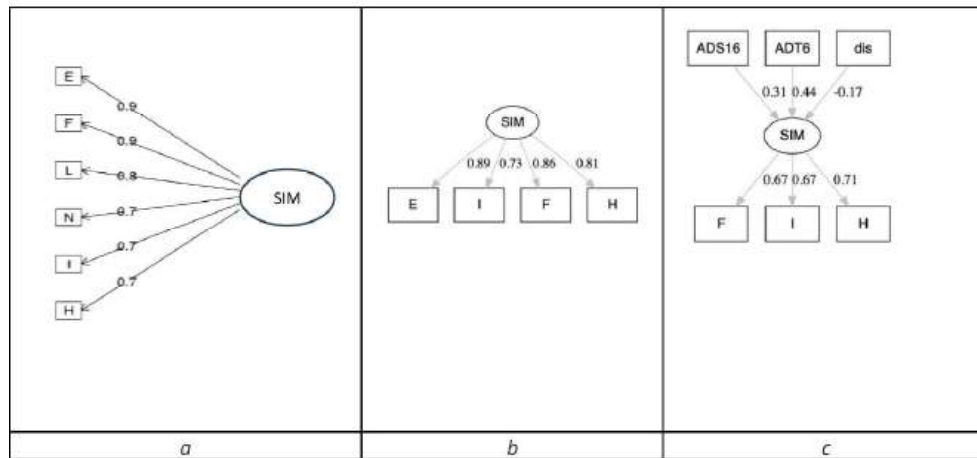


Figure 2– Path diagrams for EFA(a), CFA(b) and MIMIC(c)

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