

Cartel Cubano, 1959-1989, MuVIM

The Impact of Organizational Factors and Collaboration on the Outcome of Museum Innovation. Empirical Evidence from Valencian Museum

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- Is there a difference in the impact of organizational characteristics on museum innovation at a regional and global basis?
- What is the influence of collaboration on the outcome of museum innovation?

Literature review



Literature is still scarce.

25 relevant publications during 1989 and 201714 aiming at museum innovation5 focusing on determinants of museum innovation

Characteristics of the existing literature.

Focusing on technological and organizational innovation Emphasizing on organizational determinants of innovation Based on empirical case of museums from different countries

Limitations of the existing literature.

Cultural innovation was neglected Regional factor was under-estimated A sample of museums from different countries also mixed up the impact of region-specific institutions and cultural policies.



- Publication of determinants of museum innovatiom
- Publication of museum innovation (exp.determinants of museum innovation)
- Publication of innovation in arts and cultural organizations

Definition of museum innovation



Charc 1. As cultural organizations, museums adopt externally generated innovation as an important source of innovation.



Museum innovation is the transformation of ideas, theories or approaches into new or improved cultural products, services or processes by museum organizations in order to advance, compete and differentiate themselves successfully in the market and in society.

Taxonomy of museum innovation



Theoretical bases

- Learning theory

 Innovation is a learning
 process (Lichtenthaler 2013);
 learning is the acquisition of
 knowledge or skills, know why and know-how.
- Knowledge-based approach Knowledge can be classified into three bases – analytical, synthetic, and symbolic knowledge.(Asheim et al. 2007; Asheim & Hansen 2009)

Empirical bases

	Coography & histroy		67 50/
	Geography & Histroy	0.20/	02.5%
5	Philosophy & literature	8.3%	
oli	Fine arts	1.1%	
цп	Philology	1.4%	
Syı	Humanities	1.0%	
-	Anthropology	1.0%	
	Architecture	1.0%	
	Translation & interpretation	0.5%	
	Sociology	0.4%	
Libr	ary science & documentation	2.4%	-
	Teaching	2.1%	
1	Law	2.1%	
eric	Journalism	2.0%	
зgе	Economics & business	1.6%	
anı	Politics	0.6%	
S	Business management	0.5%	
	Toursim	0.4%	
	Cultural management	0.4%	
cal	Biology	2.6%	_
yti	Geology	1.3%	
nal	Psychology/pedagogy	1.1%	
A	Chemistry	0.5%	
ic	Conservation & restoration	7.7%	-
het	Engineering	0.6%	
'ntl	othors	2.5%	-
Sy	others		
	Ŭ	J% 10% 20% 30% 40% 50% 60%	/0%

Figure 4. The taxonomy of museum innovation

Taxonomy of museum innovation

- Cultural innovation is the innovation that relies on the symbolic knowledge base and leads to significant changes in the aesthetic and symbolic aspects of cultural production and outputs in the museum.
- Technological innovation is innovation that depends on analytical and synthetic knowledge bases and contributes to functional changes involved with cultural production in museums.
- Organizational innovation is innovation that is reliant on managerial knowledge base and is expressed as organizational changes that improve organizational and business management performance.





Determinants of museum innovation



Factors	Impacts	Hypothesis
Size	 Pos: larger museums have more financial, human and symbolic resources, essential for innovative activities, than smaller museums (Camarero et al. 2011 (Camarero et al. 2011; De-Miguel-molina et al. 2013) Neg: smaller firms show a proportionally higher degree of innovation than larger ones in relation to their size. (Camisón-Zornoza et al. 2004) Others: a curvilinear correlation between museum size and the degree of museum innovation.(Camarero et al., 2011) 	H1: The larger a museum is, the more it will engage in technological innovation (H1a), cultural innovation (H1b), and organizational innovation (H1c).
Туре	 Pos: the variety of knowledge and the combination of knowledge and technologies had a positive affect on museum innovation. (De-Miguel-molina et al., 2013) Other: all else being equal, science museums wouldn't be more innovative than art museums (Camarero et al., 2011) 	 H2: All other things being equal, nature and science museums engage more in tech. innov. (H2a), cult. Innov. (H2b), and org. innov. (H2c) than archeology and ethnography museums and arts and history museums.

Determinants of museum innovation



Factors	Impacts	Hypothesis
Ownership	 Private museums were more profit-oriented than public ones, and thus displayed higher economic aspiration and lower artistic aspiration. (Castañer and Campos, 2002) Private museums invested more in new management technologies and applied new technologies than public ones. (Vicente et al., 2012) 	H3: All other things being equal, private museums engage more in technological innovation (H3a), and organizational innovation (H3C), but less cultural innovation (H3b) than public museums.
Geographical distance	 geographic proximity benefits knowledge exchange and interaction involved in the process of innovation (Malmberg & Maskell 1997) There is a positive relationship between laser adoption and proximity to research centers and suppliers/distributors. (Verbano et al. 2008) 	H4: The closer to the provincial capital that a museum is located, the more it will engage in technological innovation (H4a), cultural innovation (H4b), and organizational innovation (H4c).



Collaboration as an organizational relationship

Relationships between cultural organizations is best characterized by collaboration rather than competition (Liao et al. 2001; Castañer & Campos 2002; Camarero & Garrido 2008).

Collaboration as a key in the system of innovation

Innovation is a process of interaction between museums and other organizations, and individuals, and with institutions that shape such interaction in the system of innovation.(Lundvall 1988; Edquist 1997) Collaboration constitutes a major means of direct interaction by an organization

with external individuals and organizations (Bureth et al. 1997)

Collaboration for sharing cost and uncertainty

Inter-firm collaborations can help share the costs and rewards of innovative activities, and thus decrease the uncertainty surrounding from innovation (Bureth et al. 1997).

Collaboration for knowledge diffusion

Collaboration is an important source of knowledge flows and exchange through inter-organization interaction (Martin & Moodysson 2011).



Mode of collaboration

The user-producer interaction mode, interaction between producers and potential users of innovation so as to transmit information about the in-use value of the new characteristics of a product to the final users of the innovation. (Lundvall, 1988) *The supplier-producer interaction mode*, peculiar network relations underlying supplier-producer interactions that may lead to technological advantage and influence the co-evolution of innovation and market structures (Dyer 1996, 1997; Malerba & Orsenigo 2009).

Agents of collaboration

- High-tech firms
- Museography-oriented firms
- Universities and research centers
- Museological associations
- Individual specialists
- Museums and cultural institutions

Collaboration beyond organization



Hypothesis

- **H5:** The greater the number of collaborations in which a museum is involved, the more that it will engage in technological innovation (H5a), cultural innovation (H5b), and organizational innovation (H5c).
- **H6:** Collaborating with *high-tech firms* helps museums to enhance technological innovation (H6a), cultural innovation (H6b), and organizational innovation (H6c).
- **H7**: Collaborating with *museography-oriented firms* helps museums to enhance technological innovation (H7a), cultural innovation (H7b), and organizational innovation (H7c).
- **H8**: Collaborating with *universities* helps museums to enhance technological innovation (H8a), cultural innovation (H8b), and organizational innovation (H8c).
- **H9**: Collaborating with *museographical association*s helps museums to enhance technological innovation (H9a), cultural innovation (H9b), and organizational innovation (H9c).
- **H10**: Collaborating with *individual specialists* helps museums to enhance technological innovation (H10a), cultural innovation (H10b), and organizational innovation (H10c).
- **H11**: Collaborating with *other museums* helps museums to enhance technological innovation (H11a), cultural innovation (H11b), and organizational innovation (H11c).

A case of Spain



- Recent cultural policy gave greater importance to "cultural decentralization" by the state government (Vicente et al. 2012), which limited to large cultural institutions that reflect the culture, value and identity of the nation, and delegates control over other cultural institutions to local administrations (Gilabert González 2016)
- the regionalization of museum systems is characterized by (a) a large investment in museum sector; and (b) the juridical and normative frameworks of museums at regional basis.
- collaboration in which museums engage usually takes place within regional and local limits rather than national boundary owing to both geographical and administrative proximity.

Policy: cultural decentralization

Administration: regionalization of museum networks

Interaction: localization of collaboration

Figure: characteristics of innovation system of museums in Spain



Measurement of variables

Technological innovation

The weighted sum of the number of ICTs that museums adopt.

Cultural innovation

- The number of permanent & temporal exhibitions inaugurated by the museum on 2015
- The number of educational programs & activities executed by the museum on 2015
- The number of academic and professional articles published by museum staff on 2015

Organizational innovation

- > Degree of changes introduced in organizational structure of the museum in the latest years.
- Degree of open and collaborative organizational culture formed in the museum to support creative and innovative activities in the latest years

Size

The number of museum staff

Туре

Museum type (arts and history; archeology & ethnography; nature & science)

Ownership

Museum ownership (public; private; mixed)



Table 1. Indicators of technological innovation

]	Frequency	Percentage	Weight	
Digital object				
Web page	49	83.1%	1	An index of the sum of
Digitized collection	26	44.1%	2	innovation was created on
Digital network				the basis of measuring the
Intranet	32	54.2%	1	number of technologies
Social media	31	52.5%	1	used in each domain
Арр	10	16.9%	3	
Digital or virtual museum	7	11.9%	3	It actually reflects the
Digital technology				It actually reflects the
Augmented reality	4	6.8%	3	adoption rate of different
3-D	2	3.4%	4	technologies among
Virtual Reality	1	1.7%	5	museums.
Digital device				
Quick Response code	18	30.5%	2	Weight assigned by a 5
Audio guide	6	10.2%	3	likert scale, 5 = most
Information station	2	3.4%	4	innovative, and $1 = \text{least}$
Others				innovative
Video Mapping	1	1.7%	5	
Diorama	1	1.7%	5	



 Descriptive statistics & Principal Component Analysis of cultural and organizational innovation

Indicators	Means	SD	Rotated c	omponent
Cultural innovation				
The number of permanent & temporal exhibitions inaugurated by the museum on 2015 (EXP)	3.800	4.425	.895	.150
The number of educational programs & activities executed by the museum on 2015 (ACT)	17.051	38.632	.828	.141
The number of academic and professional articles published by museum staff on 2015 (PAP)	2.420	4.044	.550	166
Organizational innovation				
Generally speaking, significant changes have been introduced in organizational structure of the museum in the latest years. (ORG_STRU)	2.588	1.4748	160	.869
Generally speaking, an open and collaborative organizational culture has been formed in the museum to support creative and innovative activities in the latest years. (ORG_CULT)	3.185	1.3022	.227	.815

Note: KMO of Sampling Adequacy = 0.526; Bartlett's Test of Sphericity: Approx. Chi Square = 62.163, Sig. = .000



Geographical distance

The time it takes to drive from a museum's location to its corresponding provincial capital, sourced by Google Maps

Collaboration

> The amount of actors with whom museums collaborated in the past 12 months.

Collaborative actor

- The amount of following specific actors with whom museums collaborated in the past 12 months, including:
 - a. High-tech firms
 - b. Museography-oriented firms
 - c. Individual specialists
 - d. Universities
 - e. Associations
 - f. Other museums



Data collection

Study population is all museums registered in the Valencian Community.

A questionnaire was sent to the directors of 124 museums identified and listed in the record of Valencia regional government,

Telephone communication was conducted for seeking elicit cooperation of potential respondents.

20 museums didn't answer the calling; at least 3 museums had been closed for at least one year; 59 museums responded questionnaire.

This study has a small, definite population of 121 museums with a sample size of 59, signifying that the margin of error for p=q=0.5 at 95% confidence level is \pm 9.2 %.



Descriptive statistics (1)

	Mean	Std. Deviation	Tolerance	VIF	N
Mixed museum	.08	.281	.639	1.565	59
Private museum	.19	.393	.731	1.368	59
Art and history museum	.2373	.4291	.584	1.714	59
Nature and science museum	.1864	.3928	.553	1.809	59
Size (log) ^a	1.4736	.8020	.737	1.356	59
Geographical distance (log) ^b	2.7725	1.5898	.587	1.705	59
Collaboration	5.0169	4.4159	.690	1.450	59
Technological innovation (log) ^a	1.6437	.6373			
Cultural innovation (log) ^a	1.5979	.9750			
Organizational innovation	2.8867	1.1849			

Note: a. ln (x) transformation is used.

b. ln (x +1) is used considering that value of geographical distance variable includes zero.



Descriptive statistics (2)

Factor	Crown	N	Technological innovation (log)		Cultural innovat	ion (log)	Organizational innovation		
Factor	Group	IN -	Mean SE		Mean	SE	Mean/mean rank	SE/Sum of ranks	
Province	Alicante	28	1.5212	.1363	1.3776	.1421	2.9877	.1949	
	Castellón	9	1.6299	.1317	1.8235	.3472	3.1312	.4177	
	Valencia	22	1.7689	.1152	1.7860	.2489	2.6582	.2876	
High-tech firm	No	48	1.5308	.0837	1.6511	.1530	29.03	1393.50	
	Yes	11	2.1364	.2013	1.3374	.0725	34.23	376.50	
Museography-oriented firm	No	42	1.6053	.1055	1.6081	.1691	28.63	1202.50	
	Yes	17	1.7386	.1237	1.5727	.1468	33.38	567.50	
Individual specialist	No	37	1.6299	.9634	1.4513	.1395	25.26	934.50	
	Yes	22	1.7288	.1272	1.7309	.1977	37.98	835.50	
University	No	19	1.2658	.1150	1.3158	.1887	27.18	516.50	
	Yes	40	1.8232	.0981	1.7032	.1515	31.34	1253.50	
Association	No	48	1.5867	.0927	1.3960	.1189	2.9962	.1623	
	Yes	11	1.8924	.1739	2.4358	.3295	2.4091	.4146	
Museum	No	7	1.0481	.2510	1.0637	.4180	17.79	124.50	
	Yes	52	1.7239	.0826	1.6546	.1252	31.64	1645.50	





	Model 1 Technological innovation (log)					Model 2 Cultural innovation (log)				Model 3 Organizational innovation					
	В	SEB	Beta	t.	Sig.	В	SEB	Beta	t.	Sig.	В	SEB	Beta	t.	Sig.
Control variable															
Mixed museum (No=0, Yes=1)	1.138	.319	.502	3.567	.001	062	.489	018	127	.900	1.657	.639	.393	2.592	.012
Private museum (No=0, Yes=1)	. <mark>5</mark> 98	.213	.369	2.804	.007	682	.327	275	-2.084	.042	1.119	.427	.371	2.618	.012
Art museum ª (No=0, Yes=1)	253	.219	170	-1.156	.253	.461	.335	.203	1.376	.175	062	.438	023	142	.888
Science museum ^b (No=0, Yes=1)	351	.245	216	-1.431	.158	.728	.376	.293	1.937	.058	363	.491	120	739	.464
Size (log)	.065	.104	.082	.625	.535	.486	.159	.400	3.049	.004	.125	.208	.085	.599	.552
Geographical distance (log)	.011	.059	.028	.192	.848	.006	.090	.010	.067	.947	.258	.118	.346	2.185	.034
Collaboration	.071	.020	.492	3.637	.001	.005	.030	.022	.160	.874	.102	.039	.382	2.617	.012

Note: B = unstandardized regression coefficient; SE_B = standard error of the coefficient; Beta = standardized coefficient

a. It represents arts and history category

b. It represents Nature and science category

Results



Factor	Technological i (log)	nnovation	Cultural innova (log)	ation	Organizational innovation		
	F	Sig.	F	Sig.	F / U	Sig.	
Province	.695	.503	1.383	.259	.988	.379	
High-tech firm	6.838	.011	3.433ª	.069	217.500 ^b	.362	
Museography-oriented firm	.525	.472	.016	.901	299.500 ^b	.332	
Individual specialist	.387	.536	1.397	.242	231.500 ^b	.006	
University	11.665	.001	2.297	.135	326.500 ^b	.382	
Association	2.908	.153	1.679	.001	2.172	.146	
Museum	7.744	.007	2.512	.119	267.500 ^b	.043	

Note: One-way ANOVA is used unless otherwise specified.

a. Asymptotically F distributed of Welch's ANOVA test.

b. Mann-Whitney U test.

c. Exact sig. (2 sided test)

Results



- ANOVA result exhibited that there was no difference in technological, cultural and organizational innovation between Alicante, Castellón and Valencia provinces.
- H1: The large museums only engage in more cultural innovation, but neither in technological nor in organizational innovation, in comparison with smaller ones.
- H2: There is no evidence to prove that nature and science museums engage more in technological, cultural and organizational innovation than archeology and ethnography museums or arts and history museums.
- H3: Both mixed and private museums are more innovative than public museums with regard to the adoption of new technologies and the exploration of new organizational structures and culture; further, mixed museums make a much greater contribution to technological innovation than private museums; but private museums have lower engagement in the development of new cultural goods and services than public ones.





- H4: The farther away from the provincial capital a museum is, the greater extent to which it engage in organizational innovation; however, proximity to the provincial capital doesn't lead to a greater degree of technological, cultural or organizational innovation
- H5: The more collaboration in which a museum involved, the more likely it is that the museum will engage in technological innovation and organizational innovation.
- H6-11: Technological innovation differs significantly depending on if museums collaborate with high-tech firms, university and other museums or not.

Cultural innovation differs significantly between museums that collaborate with museographical associations and that don't.

Organizational innovation differs significantly between museums that collaborate with individual specialists and other museums and those that don't.

Conclusion



- Q1: Is there a difference in the impact of organizational characteristics on museum innovation at a regional and global basis?
 - What's the same? (type and ownership)
 - What's the difference?
 - Size: No impact the outcome of technological and organizational innovation (small and med-size museum, threshold value, non linear correlation)
 - Geographical distance: proximity doesn't matter and distance encourages museums to innovate in organizational structure and culture.

Q2: What is the influence of collaboration on the outcome of museum innovation?

- Collaboration matters in technological and organizational innovation
 - External knowledge & internal knowledge
 - Technological suppliers & professional association
- Networking benefits cultural innovation in museums



谢谢! ¡Gracias!



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