

Sunshine regulation of the Portuguese public hospitals using multi-criteria decision analysis: A proposal

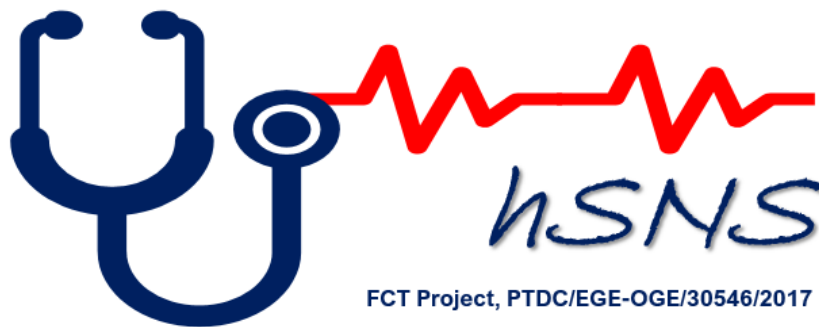
Pereira, M. A.^{1,2}

Marques, R. C.²

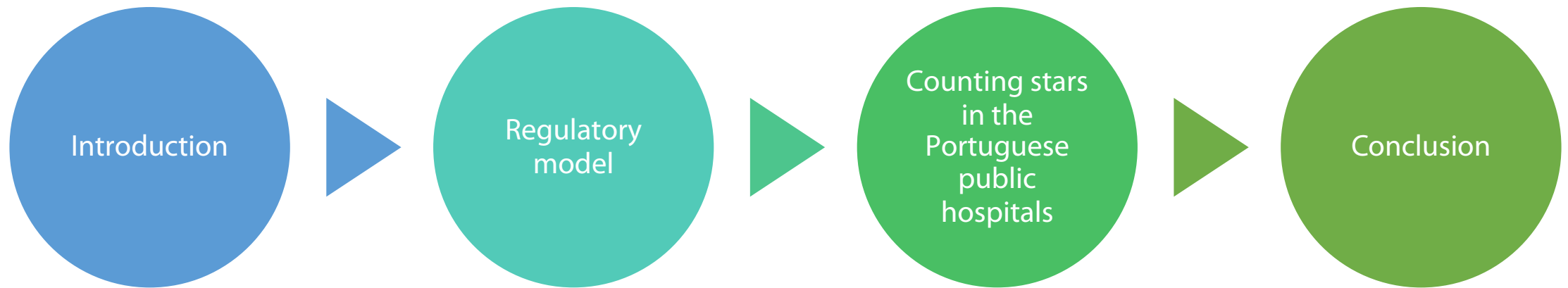
Figueira, J. R.¹

¹ CEG-IST, Instituto Superior Técnico, Universidade de Lisboa,
Av. Rovisco Pais 1, 1049-001 Lisbon, Portugal

² CERIS-IST, Instituto Superior Técnico, Universidade de Lisboa,
Av. Rovisco Pais 1, 1049-001 Lisbon, Portugal



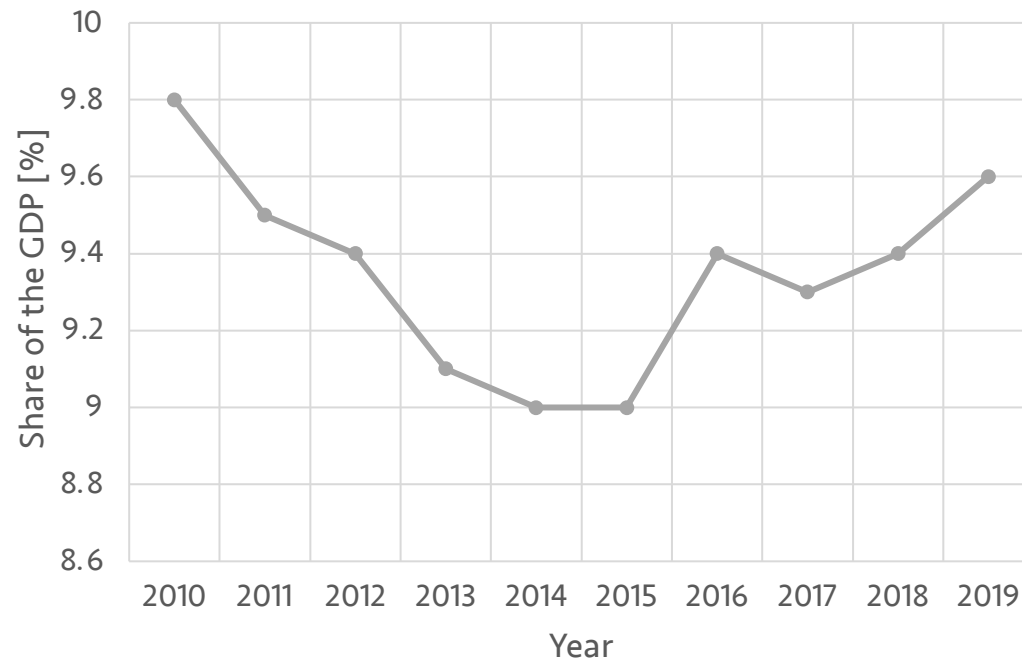
Contents



INTRO- DUCTION

(Un)sustainability of healthcare systems

Portuguese health expenditure as a share of the gross domestic product (GDP)



Poor resource management and increasing costs

Ageing and increasingly chronically ill populations

Higher demands by users regarding access to and quality of health services

The need for regulation

Naturally emerged as a critical component for rejuvenating, reinventing, and rechallenging the healthcare sector (Walshe, 2002)

Ensures a proper competition amongst healthcare providers (Khaleghian and Gupta, 2005)

Aims to protect the basic rights of the users

Sunshine regulation

Fundamental for the effectiveness
of the (Nunes et al., 2011)...

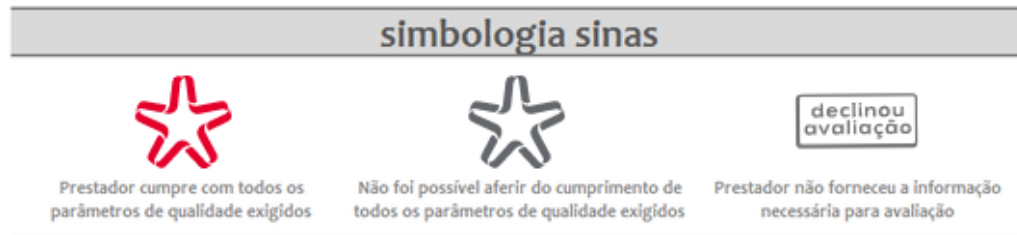
Regulatory
activity

Correct
supervision
of providers

Avoidance of
quality
shading
issues

Healthy
competition
in the sector

Entidade Reguladora da Saúde (ERS) and the Sistema Nacional de Avaliação em Saúde (SINAS)



Considers healthcare providers with inpatient service and oral health

Evaluates their global quality on five dimensions:

- Clinical excellence
- User safety
- Facilities' adequacy and comfort
- Focus on the user
- User satisfaction

Is based on rigour, transparency, and objectivity

Concerns a two-level assessment:

- Star rating
- Quality rating

Our proposal



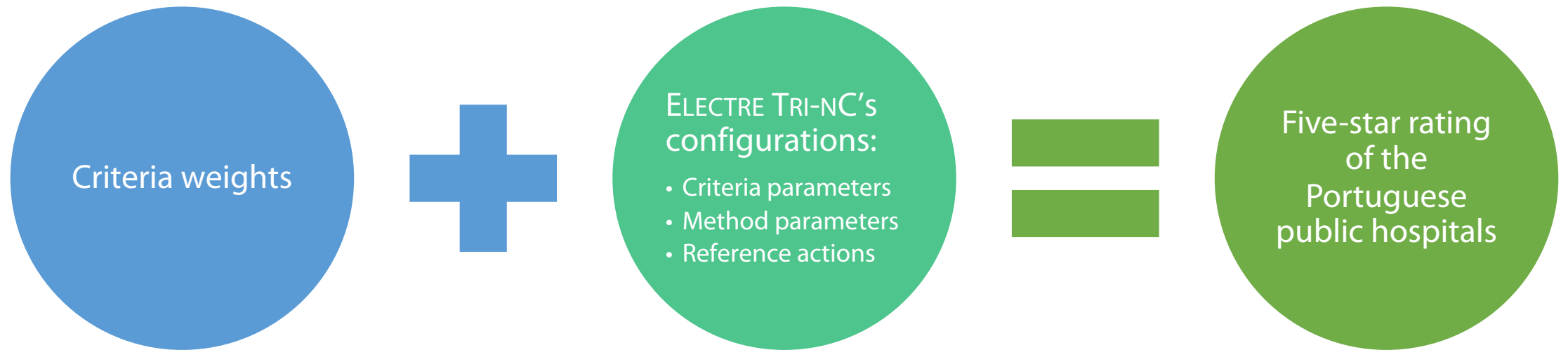
- More comprehensive
- Allows “naming and shaming”

- Takes the decision-makers’ judgments into account
- Acknowledges the possibility of a hospital to belong to more than one category

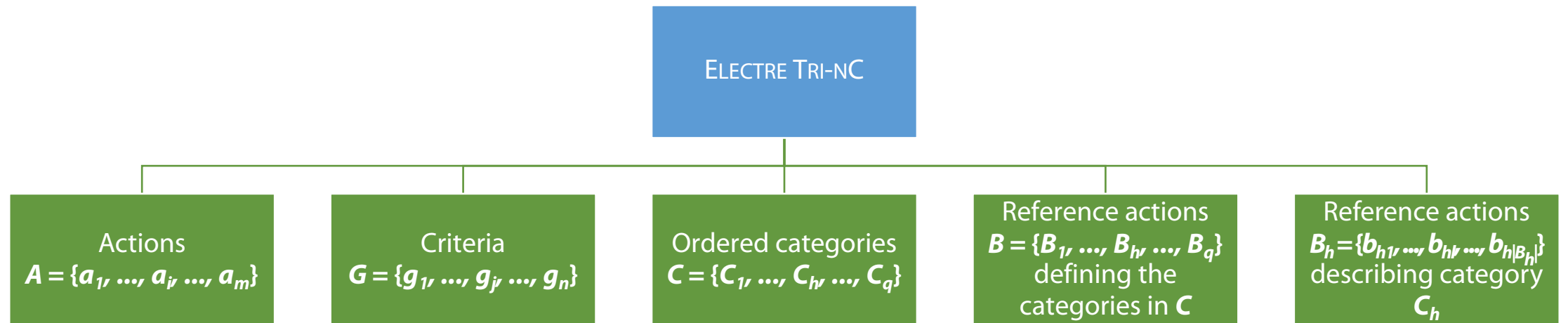
- Considers 9 criteria regarding the access to, quality of, and resources of health services

REGULATORY MODEL

Deconstruction of modelling needs



Methodological framework



Application details: Software

MCDA ULaval software version
0.6.16-RC1

Simos-Roy-Figueira (SRF)
software, available at
<http://decspace.sysresearch.org/>

Application details: Criteria

Dimension	Sub-dimension	Criterion	Indicator	Weights
Quality	Care appropriateness	Adequacy of outpatient surgeries (g_1)	Number of outpatient surgeries per 100 potential outpatient procedures	11.27%
		Readmissions (g_2)	Number of readmissions in 30 days after discharge per 100 inpatients	5.63%
	Clinical safety	Safety of vaginal deliveries (g_3)	Number of assisted vaginal deliveries with 3rd and 4th degree lacerations per 100 deliveries	11.27%
Access	Services' timeliness	Timeliness of medical appointments (g_4)	Number of non-urgent first medical appointments performed in adequate time per 100 first medical appointments	9.86%
		Large delay of care (g_5)	Number days until scheduled surgical procedure per number of inpatient scheduled surgical procedures	5.63%
	Services availability	Occupancy (g_6)	Annual occupancy rate	7.04%
Resources	Financial	Staff expenses (g_7)	Staff costs per standard patient	16.90%
		Medication expenses (g_8)	Medication costs per standard patient	16.90%
		Outsourcing expenses (g_9)	Outsourcing costs per standard patient	15.50%

Application details: Modelling parameters

Threshold	g_1	g_2	g_3	g_4	g_5	g_6	g_7	g_8	g_9
Indifference, q	2.00%	1.00%	0.05%	2.00%	0.10	2.00%	40.00€	30.00€	20.00€
Preference, p	4.00%	2.00%	0.12%	4.00%	0.20	4.00%	60.00€	50.00€	45.00€
Veto, v	20.00%	5.00%	1.00%	25.00%	1.00	20.00%	1000.00€	600.00€	400.00€
Discrimination, λ					0.75				

Application details: Modelling parameters

Category	Reference	g_1	g_2	g_3	g_4	g_5	g_6	g_7	g_8	g_9
★★★★★ C ₅	b_{51}	94.86%	6.08%	0.05%	95.93%	0.42	84.74%	1040.00€	99.00€	362.00€
	b_{52}	91.68%	6.49%	0.24%	89.23%	0.53	83.33%	1226.72€	208.45€	406.71€
★★★★★ C ₄	b_{41}	88.51%	6.89%	0.44%	82.53%	0.65	81.92%	1413.45€	317.89€	451.42€
	b_{42}	86.60%	7.30%	0.63%	78.51%	0.76	81.08%	1600.17€	427.34€	496.13€
★★★★ C ₃	b_{31}	84.06%	7.70%	0.83%	73.15%	0.87	79.95%	1786.89€	536.79€	540.84€
	b_{32}	82.16%	8.26%	1.07%	69.13%	0.99	79.10%	1893.71€	595.02€	573.57€
★★★ C ₂	b_{21}	79.45%	9.01%	1.39%	64.33%	1.16	76.85%	2036.13€	672.66€	617.20€
	b_{22}	76.75%	9.57%	1.63%	59.54%	1.28	74.60%	2142.95€	730.89€	649.92€
★ C ₁	b_{11}	74.05%	10.51%	2.03%	54.74%	1.49	72.35%	2320.97€	827.95€	704.46€
	b_{12}	71.34%	11.44%	2.43%	49.94%	1.69	70.10%	2499.00€	925.00€	759.00€

COUNTING
STARS IN THE
PORTUGUESE
PUBLIC
HOSPITALS

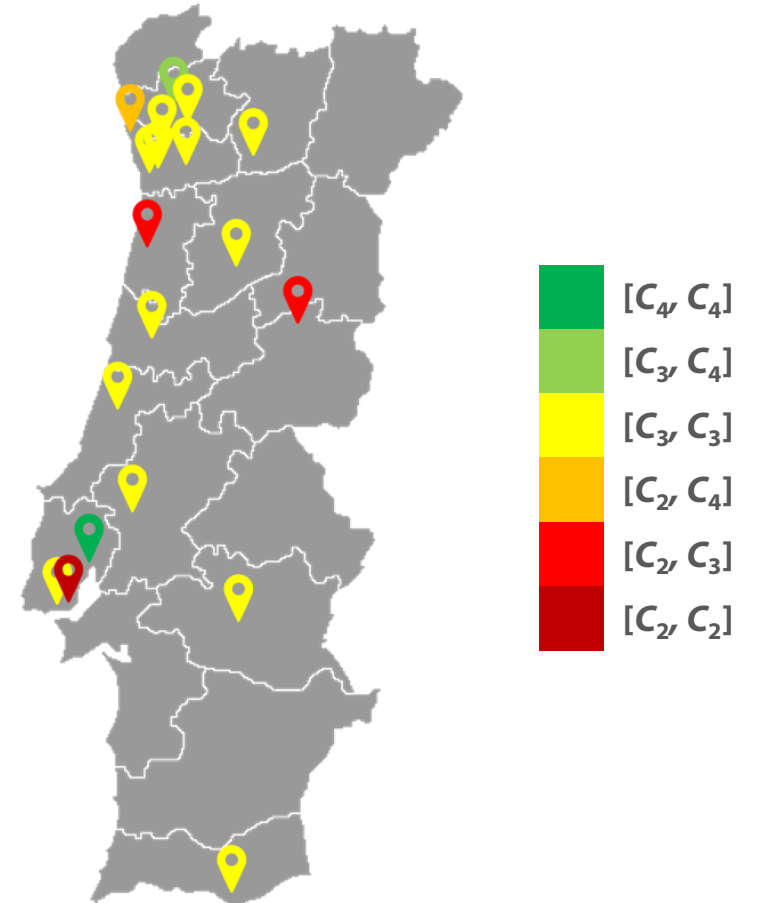
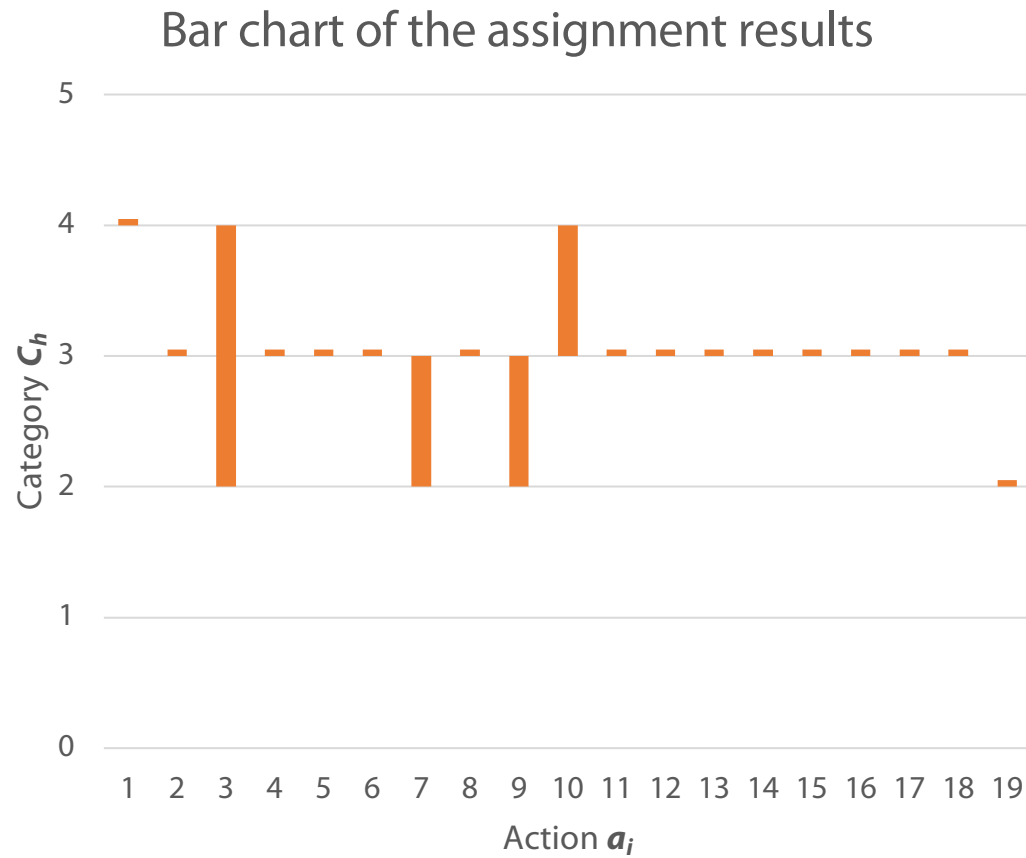
Performance table

Group	Institution	g_1	g_2	g_3	g_4	g_5	g_6	g_7	g_8	g_9
B	Hospital de Vila Franca de Xira, PPP	84.59%	7.85%	0.47%	69.39%	0.43	70.10%	1456€	308€	604€
	Centro Hospitalar do Médio Ave, EPE	83.92%	7.31%	0.73%	75.86%	0.75	81.59%	2275€	250€	662€
	Centro Hospitalar Póvoa de Varzim/Vila do Conde, EPE	71.34%	6.56%	0.61%	95.93%	0.55	77.39%	2428€	99€	620€
C	Hospital da Senhora da Oliveira, Guimarães, EPE	79.60%	8.06%	0.80%	57.12%	0.58	81.80%	1497€	773€	472€
	Centro Hospitalar Tâmega e Sousa, EPE	85.81%	6.69%	0.63%	59.84%	0.85	74.69%	1656€	289€	616€
	Centro Hospitalar de Leiria, EPE	90.29%	8.43%	0.44%	56.10%	0.74	80.48%	1740€	320€	564€
	Centro Hospitalar do Baixo Vouga, EPE	84.09%	7.01%	2.43%	66.31%	0.47	84.74%	2006€	469€	512€
	Hospital Distrital de Santarém, EPE	81.78%	11.07%	0.36%	67.22%	0.60	76.45%	1967€	636€	759€
	Centro Hospitalar Universitário Cova da Beira, EPE	72.85%	7.34%	0.36%	76.06%	0.69	78.14%	2499€	501€	660€
	Hospital de Braga, PPP	84.80%	6.99%	1.74%	76.73%	0.64	82.43%	1040€	433€	362€
D	Centro Hospitalar Tondela-Viseu, EPE	94.86%	7.12%	1.42%	80.27%	1.69	81.58%	1780€	492€	487€
	Hospital Espírito Santo de Évora, EPE	76.17%	6.13%	0.68%	61.68%	0.42	81.56%	1736€	547€	644€
	Centro Hospitalar Trás-os-Montes e Alto Douro, EPE	86.61%	11.44%	0.57%	64.08%	1.09	81.78%	1806€	471€	579€
	Centro Hospitalar Universitário do Algarve, EPE	80.17%	7.20%	0.05%	73.14%	1.38	80.82%	2103€	789€	653€
E	Centro Hospitalar Universitário de São João, EPE	79.63%	7.29%	0.65%	49.94%	0.95	79.84%	1441€	709€	376€
	Centro Hospitalar Universitário do Porto, EPE	80.54%	6.08%	1.05%	72.72%	0.65	73.20%	1439€	925€	364€
	Centro Hospitalar e Universitário de Coimbra, EPE	80.26%	8.91%	0.38%	65.97%	1.31	78.16%	1564€	670€	442€
	Centro Hospitalar de Lisboa Ocidental, EPE	78.93%	7.78%	0.37%	70.05%	1.44	80.35%	1644€	674€	441€
	Centro Hospitalar Universitário de Lisboa Central, EPE	84.74%	7.08%	2.03%	75.08%	1.34	77.88%	1874€	844€	459€

Results



Results



CONC- LUSION

Achievements

A sunshine regulatory model using multi-criteria decision analysis was proposed

The vast majority of the Portuguese public hospitals belongs to a "Three stars" category

There are no providers with "One star" or "Five stars" category assignments

Stability and robustness analyses demonstrated the fortitude of the results

The proposed model proved not only its usefulness, but also its credibility and validity, as well as its potential applicability

Limitations

The model represents a "picture" of the Portuguese public hospitals in 2018

There is a lack of capacity of the providers to independently improve their performances due to funding policies

The primary healthcare centres surrounding the hospitals have an impact in their performance, as well as the quality of the healthcare professionals employed in each hospital

The contributions of decision-making actors from different areas in the sector would result in different criteria weights

Future work

“Naming and shaming” models would be a good (if not better) fit in non-Beveridgian health systems and in the private sector

The correction of the limitations would improve the informative potential of the model for regulatory policy purposes within the ERS

hSNS project
(PTDC/EGE-OGE/30546/2017)

AC- KNOWL- EDGE- MENTS

FCT PhD scholarship
(SFRH/BD/149283/2019)

Sunshine regulation of the Portuguese public hospitals using multi-criteria decision analysis: A proposal

Pereira, M. A.^{1,2}

Marques, R. C.²

Figueira, J. R.¹

¹ CEG-IST, Instituto Superior Técnico, Universidade de Lisboa,
Av. Rovisco Pais 1, 1049-001 Lisbon, Portugal

² CERIS-IST, Instituto Superior Técnico, Universidade de Lisboa,
Av. Rovisco Pais 1, 1049-001 Lisbon, Portugal

