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Research Report

Gender bias in cultural tightness across the 50 US states, its correlates, and links to gender inequality in leadership and innovation

Xin Qin, Roy Y J qu *, ing Tian, n.u i nd qun qin *

*Sun Yat-sen Bu in Sch e, Sun Yat-sen Univ rity, No 135 Xingang t Road, Guang hou, 510275, hina
Kong qin Sch e Bu in , Singa or Manag ment Univ rity, 50 Stamford Road, 5064, Singa or , 178899, Singa or
Sch e Manag ment, Guangdong Univ rity T hnology, No 161 Yingbing Road, Guang hou, 5105 0, hina

*To whom orr ondn hould b ddr d: i royyj nu @ u du g, hn n 8@ i yu du n
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Abstract

ultura tightn ss th ory, which n ds that tight ultur s hav rigid norms and sanctions, provid uniqu insight into ultura variation How v r, urr nt th oriz ing ov rlooks n d r di r n s in ultura tightn ss Addr ssing this gap, this r s arch xamin s how two forms of gend r inequality within th societal l v l By r cruiting 15,425 r sp ndents, w found that p rc iv d gend r roles in ultura tightn ss ar lo ly t d to th Unit d St t s' gend r inequality in gend r roles in ultura tightn ss was s parat d into p rc iv d r sponsibilities (r ligious and ducational ideology) and gend r-r lat d hor s (gend r roles in ultura tightn ss was positively ass ci t d with p rc iv d gend r inequality in (Bu in ss and ducational) l ad rship and innov tion, two ar jor ar as in which w ll-d fin d ar as of ultura nor s ar ssu d to b r l v nt for gend r quality in l ad rship Ov ll, this r s arch xp nds ultura tightn ss th ory and off rs ultura nor s ass ssm nt s r l v nt for gend r quality in l ad rship

Keywords: ultura tightn ss-l oss th ory, gend r inequality, gend r roles, l ad rship, innov tion, Unit d St t s

Significance Statement

ultura tightn ss th ory, which n ds that tight ultur s hav rigid norms and sanctions, provid uniqu insight into ultura variation How v r, urr nt th oriz ing ov rlooks n d r di r n s in ultura tightn ss r s arch ha s gend r roles in ultura tightn ss likely xist and it varies a ross di r nt societies Surprisingly, w found that p rc iv d gend r roles in ultura tightn ss a ross the 50 US st t s found both univ rsality with p rc iv d societal ideologies (r ligion and ducational ideology) and gend r-r lat d hor s (gend r roles in ultura tightn ss was positively ass ci t d with p rc iv d gend r inequality in (Bu in ss and ducational) l ad rship and innov tion, two ar jor ar as in which w ll-d fin d ar as of ultura nor s ar ssu d to b r l v nt for gend r quality in l ad rship Th s findings xp nd ultura tightn ss th ory by inj cting gr at r gend r di- n sion and off r ultura nor s ass ssm nt s r l v nt for gend r quality

ultura y ha s gr at ly v ri d ultura tightn ss and s v r - n t d ri s di r nt ultur s tight ultur s hav str ng norms and sanctions, whil ultur s with w k norms and ligh t ns ar s v r (1) This tr nd has r ais d uniqu insights toward und rstanding ultura variation a ross s v ral ti s (2–5) How v r, urr nt th oriz ing ov rlooks n d r di r n s in ultura tightn ss n th urr nt r s arch, w r as ss how p rc iv d gend r roles in ultura tightn ss lik ly xist and how it varies a ross di r nt societies Furth r r, w th oriz how p rc iv d gend r roles in ultura tightn ss is ass ci t d with p rc iv d gend r inequality in l ad rship and innov tion s u s gend r inequality in l ad rship and innov tion, a ajor ar a of r s arch and r g d r p ti ti s hav shown to b two of th ar as in which w ll-d fin d gend r nor s ar ssu d to b r l v nt d in xist l ad rship (including Bu in ss and ducational l ad rship) and ld to invo v innov tion (6–12) Mor ov r, gend r inequality in l ad rship and innov tion is int gr ally r l v nt to ultura tightn ss th ory By pu ting th s p rc iv d l ad rship and innov tion invo v r viving x p ctations of nor s and ha s anging th ultur quo (13, 14)

Th r s r two th or tical r asons why p rc iv d gend r roles in societies should v ry a ross st t s Fir t, in ord r to xist ti s, w n d to co ly with str ng r gional nor s (ajority gend r tr rty is a nor) co ld r d with ss (15) For x ple, s i- ti s r gard w ll n wh n th ir s r v ri ving hild r n

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r tri t d de"i ti re nder n w k x (36) nd rv te ju ti y"i n ew r, ntre ,nd de"ing n

Additiona y, we"i n (e"i rd with"i n) "y "er ny ig tnre t , nging re"i re ry, de"i ti vie n , xua "i nt, te nu"n n t king (41, 42) ni "i ng nd ey e n tnre t , tn "jority e individua id nti d vi ti"i in vie n nd id nti d t k d er ehn er nd e"i"i r ia x r we"i ng nd gi Tn e R ert en Tr king in r en in 2020 und t 84 vi ti"i e nu"n n t king "ong tnr untri in Nerth A"i ri (i n d, M xi e, nd tn Unit d St t) w r we"i n nd gi (43) A ording y, te ret twe"i n re"i u n tnre t nd tn e i- t d ra r"i, e"i e i ti "ightd v e tight rner"i er we"i n e"i rd with"i n

Implications of gender bias in cultural tightness

ugg t tra t gnd r eh in u tura tightn i"i ert nt i"i i tion en gnd r in qua ity in d r ni nd innev tion Su in tn twe de"in e t n r quir ha nging tn - tu que nd r ving xpe nt ru nd ner"i S i y, d r- ni i tn re t) e in lu n ing tn tiviti e n erga ni d grau in it ert tewardge tting nd ge ni v- "i nt (44), nd it inv ri y inve v ding nd "e ging ng (14, 45, 46) Si"i i y, innev ter —tne wne u u- yg n t nd i"i "i nt nev nd u id (47)—r ru ek r wne ha ng t d wy e doing tning tn y g n t nd i"i "i nt r tiv id (13, 48–50) Tnu , w ug- g tgnd r eh in u tura tightn i e t d with g nd rin- qua ity in u in nd e iti a d r ni nd innev tion, unting er v ri tion in k y gnd r di riti re tn 50 US t t

Measuring gender bias in cultural tightness

r ruit d rti i nt re tn 50 US t t tnrugn A"e en M ni Turk (MTurk) A tnrugn MTurk n wid y u d in e i in r r n (51–53), w knew dg t tn ir werk r r net n ri y r nt tiv e tn g- e e ua tion (MTurk "i t nd te nt rn tu r , wne r yeung r nd "er du t d) Additiona y, MTurk "i e"i e itien v ri with ti"i nd tn r "ight e en rn e r- t d rti i tion (54, 55, Di u ien nd Su "i nt ry T xt er"er d i n

Su [illegible] nt ry T xt on how gn w n w ri [illegible] wa [illegible] ur d nd T [illegible] S1 or our [illegible] n w ri [illegible]) S i y, or t v g nd r qu ity, w t d nr g nd r qu ity or [1] re [illegible] nr our (i) t g nd r rity ind x re [illegible] n R r nt e [illegible] n g nd r rity nd x 2019 R rt, wni n [illegible] ur w [illegible] n r nt tg u t n g , t , nd n tion v , (ii) t g nd r qu ity or re [illegible] n t Hu 2020 B t nd rt St t or e [illegible] n qu ity R rt, wni n [illegible] ur n xt nt tw ni n w [illegible] n r iv qu tr t [illegible] nt in nr k y de [illegible] in (i work nvironm nt, du tion nd n tion, nd citi [illegible] w r [illegible] nt), nd (iii) t [illegible] uni i qu ity ind x re [illegible] n Hu [illegible] n Right ign Found tion nd n qu ity F d tion n titut in 2020, wni n [illegible] ur n xt nt tw ni n t i [illegible] dying STQ e- in u ion in n in w , ci i nd rvi Fer t [illegible] u- inity, w t d nd e [illegible] ut d g nd r d n u work di rity tie—n tie w [illegible] n [illegible] n [illegible] inut te [illegible] n [illegible] n [illegible] i- nut in doing routin n u work in n t re [illegible] Ru nn r nd M u [illegible] (2016) (58), wni n r l t n t dition i [illegible] in [illegible] i- ii Hi y [illegible] u in u tur t nd te nder t dition g nd r t r ty i vi w r g rding g nd rr x tion in n [illegible] i- ity (w [illegible] ng r x t d te de [illegible] er n u work n [illegible] n) (59, 60) A u n, w u d ni tie r xy e t [illegible] u inity Fer t t ivi [illegible] , w u d n t t ivi [illegible] ind x d v e d y nd nd g n (1999) (61), wni n u d ight it [illegible] r t d te r [illegible] ity tru tur nd ivings rong [illegible] nt , e , citi , ri- giou , nd one [illegible] i ti nd n u [illegible] d te r t n ev r- t ivi [illegible] er er n t ound t g nd r in u tur tign tn [illegible] d t y g tiv rr tion with g nd r qu ity (er t g nd r rity ind x, $r_{[48]} = -0.50$, < 0.001, $= 50$, er t g nd r qu ity er , $r_{[48]} = -0.62$, < 0.001, $= 50$, er t uni i qu ity ind x, $r_{[48]} = -0.47$, < 0.001, $= 50$) ut [illegible] d t y e itiv rr tion with t [illegible] u inity ($r_{[48]} = 0.39$, $= 0.005$, $= 50$) H w v r, n r tion ni tw n g nd r in u tur tign tn nd t t ivi [illegible] w not igni nt ($r_{[48]} = 0.08$, $= 0.593$, $= 50$) Ov , n r u t indi- t d t g nd r in u tur tign tn r di nt re [illegible] n e n r g nd r- t d n tru t

Table 1 w g nd r in u tur tign tn re n 50 t , wn r Fig 1 r nt n [illegible] n [illegible] er t Ten 10 t with n r g t g nd r in u tur tign tn r Ut n, Mi i i i, y [illegible] ing, nd n , Sou n r ci n , A [illegible] , t irgini , ui n , Onio, nd e rgi Ten 10 t with n [illegible] t g nd r in u tur tign tn r M ryn nd, H wii, ington, A k , Ari n , D w r , N w M xi , r [illegible] nt, N w J r y, nd e rg

n xt t d wn n rn r w r di r n ing nd r in u tur tign tn t n r gion (i Nor n t, Midw t, Sou n, nd t, Fig S1) nd divi ion v (g N w ng nd nd Sou n At nti , Fig S2), giv n t r viou r r n e und t t rt e n r gion into Unit d St t r , e t d with i u tur (4) An ANO A t indi t d igni nt di r n ing nd r in u tur tign tn [illegible] ong n ur ri- [illegible] ry r gion —Nor n t, Midw t, Sou n, nd t—r gni d y n US n u Bur u, $F_{(3, 46)} = 3.41$, $= 0.025$, $\eta^2 = 0.18$ nd r in u tur tign tn er n ur ri [illegible] ry r gion w [illegible] ow (re [illegible] n g t n te [illegible]) Sou n r gion (= 16, M n = 3.44, SD = 0.93, 95 on d n int rv [ ] [2.95, 3.94]), Midw t r gion (= 12, M n = 3.27, SD = 0.66, 95 [2.85, 3.69]), t r gion (= 13, M n = 2.58, SD = 1.32,

Table 1. nd r in u tur tign tn in n 50 US t

-P-Me.T7mfmfmFT-fP((1-P-MePEIsTF1/-(1M4d9fT(1na sEIsTF1/VNTM fT(6Pds1-P-M

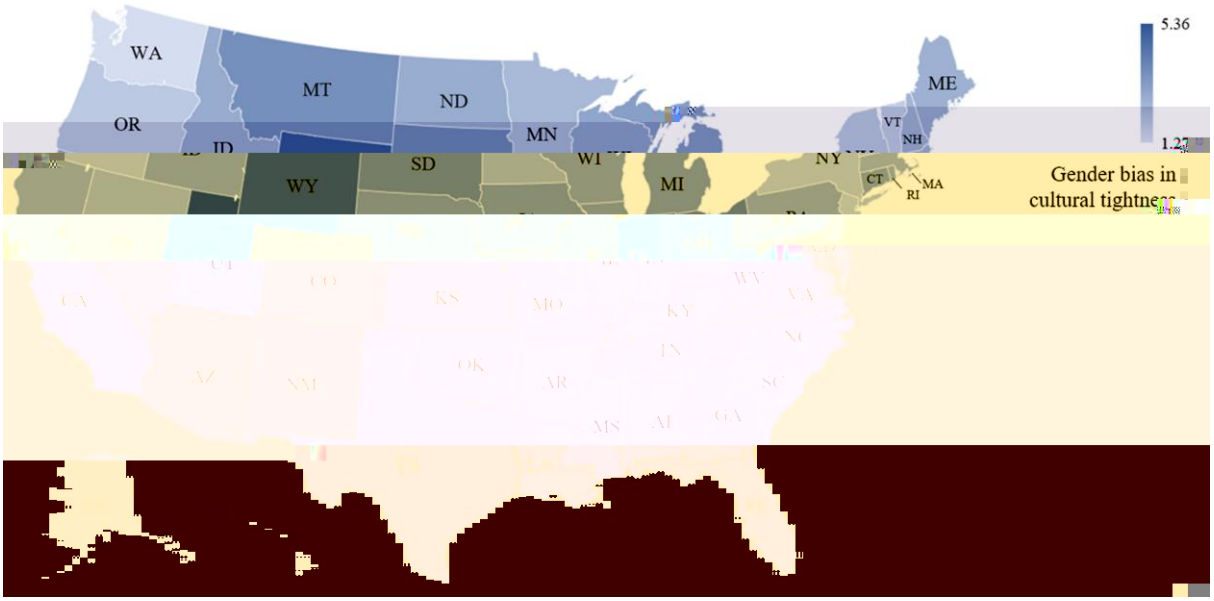

Fig. 1. nd r in ultura tightn in th 50 US t

95 [1 78, 3 38]), nd Northn tr gion (= 9, M n = 246, SD = 0 4 2, 95 [214, 278]) R ut Tuk y hon t y igni nt di- rn (HSD) t th t urbn rd n t t dtw ni th Southn r gion r nd rgin y igni nt di rn with th Northw t r gion r (n = 0 98, = 0 39, = 0 069) nd th t r gion r (n = 0 86, = 0 35, = 0 078), th r w n igni nt di rn tw n y tw r th ur r gion (Tabl S2 r nd ri tiv t ti ti)

How v r, wh n inv tig ting th di rn r gnd r in ultura tightn t th r i r gion divi ion v i, h ANOVA (v n t t, $F_{[8, 41]} = 3 84$, $= 0 00$) ing th US n u nin r gion divi ion (i N w ngl nd, Midd Atl nti , t Northn ntr , t Northn ntr , Southn Atl nti , t Southn ntr , t Southn ntr , Mount in nd i) indi t d igni nt di rn ing nd r in ultura tightn , ($F_{(8, 14 38)} = 6 26$, $= 0 001$, $\eta^2 = 0 36$) f - Howv r th t t d n t t dtw n t (= 5, M n = 1 79, SD = 0 56, 95 [1 10, 248]) nd th t t Southn ntr (= 4, M n = 3 60, SD = 0 28, 95 [3 16, 4 04], $d_{Cohen} = -1 81$, = 0 29, = 0 009) Furth r r, th N w ngl nd r (= 6, M n = 257, SD = 0 37, 95 [218, 295]) w igni nt ly w r r d with th t Southn ntr r ($d_{Cohen} = -1 03$, = 0 20, = 0 016) (Tabl S3 r nd ri tiv t ti ti)

Correlates of gender bias in cultural tightness

nd r in ultura tightn i ik ly t d with w rity r ir ritia t r (r ligion nd ritia id l gy) nd g nd r-r l t d n rm t t th t ti v ri bl r ining t th t r (th ir rr nding) ur r known in Tabl S1) nd nd ut d tw t r rdin ry l t qu r (OLS) r gr i n t t th t r th ri bl n g nd r in ultura tightn For h n ly i , w r t nd ut d r gr i n with ut ny ntr l ri bl , r ntr ting r f r ir it nd g nd ri in r ul tion in th t (i 1—th nu r w in r ul tion/th nu r in r ul tion) ntr l d r f ir it u w v i r n i d v r in t r t d with hig r v l r gnd rin qu lity (6) Furth r r, w ntr l d r gnd ri in r ul tion (i r in w in) it y t nti ly t r t d with gnd r in ultura tightn in th r dir tion For x , th t with r in y in th t nti ly r r v nd r tr r l u (34, 36), th r by r du ing r n t int n w in, r, nv r y, th t with r in y d r gnd r in ultura tightn , in w uld v t r t r w in w r th in rity

Sociopolitical factors: religion

n r tiv r ligion t nd t nd r tr diti n l gnd rr r w in (3 , 33), wh h in turn r liti ly t d with tr ng r nt int n w in A id th k dr , w ugg th t th r ligi ity i r liti ly link d t gnd r in ultura tightn n in with Harrington nd Gelfand (2014), w d f t d tw r i , ur r th r ligi ity (4) S i ly, w x t d d t r in (R r n nt r (2014) th t h w th r nt g r d ut wh r r hig y r ligiou , i r n r ligion, r qu nt y r y r, w r h i tt nd n , i in d, r ligiou i - i , nd r k d wn r ligiou d f k y r ligiou tr diti n ddition, r in u (2016), w x t d th r nt g r d ut wh r r y r ligiou , d t y r ligiou , nd n- r ligiou A h wn in Tabl 2, th r nt g r d ut wh r r hig y r ligiou ($b = 4 46$, $= 1 22$, $< 0 001$), i r n r ligion ($b = 4 41$, $= 1 7$, $= 0 001$), r qu nt y r y r ($b = 4 8$, $= 1 37$, $< 0 001$), w r h i tt nd n ($b = 7 58$, $= 1 53$, $< 0 001$), i in d ($b = 4 50$, $= 1 4$, $= 0 003$), nd r ligiou i - i ($b = 7 10$, $= 2 7$, $= 0 003$) w r x t d t gn- d r in ultura tightn A h wn in Tabl 3, th r nt g r d ut wh r r n r ligiou ($b = -6 97$, $= 23$, $= 0 004$) w g tiv ly r l t d t gnd r in ultura tightn A h wn in Tabl 4 (u d t), th r nt g r d ut wh r r v ry r ligiou ($b = 6 48$, $= 1 33$, $< 0 001$) w x t d t gnd r in ultura tightn , wh r th

Table 2. ink tw n ri igion (w) g nd g nd r in utura tigntn

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
ir nt g g du t wn r ni y ri igiu	5 51***	4 46***										
	(1.08)	(1.22)										
M rtn ri igion			5 45***	4 41**								
			(1.09)	(1.27)								
Equ n y y r					6 07***	4 82***						
					(1.25)	(1.37)						
ri i tt ndn							8 83***	7 58***				
							(1.41)	(1.53)				
Bi i in d									5 83***	4 50**		
									(1.26)	(1.42)		
R ligiu i											8 49***	7 10**
											(2.17)	(2.27)
O r n (g) 1977–2020		−1 34+		−1 29+		−1 47+		−1 26+		−1 40+		−2 03**
		(0 74)		(0 76)		(0 73)		(0 66)		(0 77)		(0 71)
Gnd ri tn in u tion 1970–2020 (r n tn n w n)		0 1 2		0 51		−0 35		−0 18		−0 71		2 34
		(3 61)		(3 67)		(3 62)		(3 30)		(3 69)		(3 90)
on tnt	−0 0 2	14 66+	0 13	14 21+	−0 29	15 88+	−0 16	13 53+	−0 69	14 82+	−3 47*	18 97*
	(0 60)	(8 13)	(0 58)	(8 37)	(0 69)	(8 08)	(0 52)	(7 28)	(0 81)	(8 60)	(1 66)	(8 01)
	50	50	50	50	50	50	50	50	50	50	50	50
	0 35	0 40	0 34	0 38	0 33	0 39	0 45	0 49	0 31	0 36	0 24	0 36
	25 9 2	10 0 2	25 10	9 48	23 41	9 63	38 94	14 78	21 4 2	8 60	15 30	8 50

+ < 0 1, * < 0 05, ** < 0 01, *** <

r nt g g du t wn r nnr ligiu ($b = -5\ 47$, $S = 1\ 24$, $< 0\ 001$) w n gtiv ly r t d t r gnd r in u tura tigntn Tn r nt g g du t wn r d t ly r ligiu ($b = 0\ 60$, $S = 4\ 56$, $= 0\ 895$) w n t igni ntly r t d t r gnd r in u tura tigntn

Sociopolitical factors: political ideology

Gnd r in u tura tigntn i r l t d in itia in titution , id ogi , nd p ti i y, b t with itia n r tiv t nd t r nd r " tri r ha u , wni r r t d t r gnd r in u tura tigntn (34) Tnu , w ugg t tha t t wn r n r tiv k u rg r r n tn u tion r " rik ly t v rg rg nd r in u tura tigntn Tr ly tni , w t d d t r " tn w R rn ntr (2014) n wing t t v d t n tn r nt g n r tiv wa itiv ly i- t d with gnd r in u tura tigntn ($b = 11\ 65$, $S = 1\ 81$, $< 0\ 001$)

n ddition, w t d gnd r " ut d tn r rtion R ubli n in tn US S nat nd Hu R r nt tiv r " tn Bi gra hi Dir tory tn Unit d St t ngr (2019–2021, i tn 116tn ngr) R ut in T bl 5 indi t d tha t tn r nt g R ubli n in tn US S nat ($b = 1\ 28$, $S = 0\ 26$, $< 0\ 001$) nd in tn Hu R r nt tiv ($b = 1\ 74$, $S = 0\ 33$, $< 0\ 001$) w al itiv ly r t d t r gnd r in u tura tigntn n u l, tn r ut ugg t d tha t t with " r r " ing n r tiv itia id gy - r t r v rg rg nd r in u tura tigntn

Gender-related threats

Gnd r-r t d ia tnr t in luding tn n v nt xi " nd n ti xi " r r t ding i tha t w " n in itr - tri t d d " ti r nd r tn w k x (36) Tn y r v t ju ti y " n w r, ntr nd d " ing n Tnu , w " n in t wn r itn r r " r xi i " " n rik ly t x ri n gr t r " tn i n t ditiona gnd r r nd n n gr t r n t int n tn " A u n, w ugg t tha t x- i " i itiv ly r t d t r gnd r in u tura tigntn

A ri r t d t r xi " i i ti t n t w rd x- u div r ity r i ti t t v " r n ttitud t w rd - n , gy , i x u nd t n gnd r (T) individua r rik ly t v " r i ttitud t w rd w " n (63, 64) n ddition, i ti wn r r v w rn gtiv vi w ut tn wn d n t u t ditiona gnd r r t nd t w rd v tri r ha u tur (63) nd tnu w r n t int n w " n A rding ly, w " n in u n i ti " y x ri n w r ia tnr t Tnu , w ugg tha t t t r in v r r t ting T individua r " di ri " ina tion w u d ik ly t v " u rg nd r in u tura tigntn

T t tn r rition , w t d d t n t v x- i " r " (i) tn r d u Surv y (2017) (i t xi " i) nd (ii) tn DDB N d " i ty Surv y (1975–1998) (i t xi " i ii) S i y, b t xi " i i " ri d v it " t tr l t d tri r ha gnd r r nd gnd r tr t y r " tn r d u Surv y (g On tn wn , " n k t r itia d r tn w " nd r), wn r t x- i " i ii " ri d n r v it " t tr l t d tri r ha gnd r r nd gnd r tr t y r " tn DDB N d " i ty Surv y (g " n i n tn n ") u x " - in d t ti r " tn A ri n u Ata (2019) r gr ding tn r nt g r wn v r w r t ting tn T

Table 3. ink ̈ tw n r\igion (i w, ̈r kdown o k y r\igiou) nd g nd r ̈ in u_tup_ tigntn

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16	Model 17	Model 18
N nr\igiou	−8 38*** (2.23)	−6 97** (2.32)																
Buddni t ̈			−25 68* (11.63)	−16 83 (11.54)														
g tn i					−5 08** (1.47)	−3 76* (1.69)												
ng\ig_ ̈rot nt							3 73** (1.20)	2 10 (1.36)										
Hndu									−63 83** (19.74)	−56 86* (23.54)								
B k ̈rot nt											5 27* (2.38)	4 67+ (2.49)						
J w													−27 54** (8.97)	−29 57* (11.02)				
M in.in ̈rot nt															0 13 (2.47)	−0 73 (2.24)		
M r ̈ n																	3 71* (1.70)	3 99* (1.63)
O ̈ r ib (.g) 1977–2020		−2 07** (0 71)		−2 37* (0 75)		−1 45 (0 87)		−1 87 (0 86)		−1 28 (0 88)		−2 48** (0 73)		−1 13 (0 87)		−2 53** (0 76)		−2 15** (0 73)
nd r i ̈ n in u tion 1970–2020 (r in tn w n)		2 27 (3 93)		−0 03 (4 12)		−4 28 (4 03)		−1 91 (3 97)		−6 54 (4 33)		2 28 (4 42)		−8 76+ (4 62)		−1 64 (4 06)		−5 24 (4 10)
n nt	4 93*** (0 53)	26 44*** (7 40)	3 18*** (0 16)	27 49** (7 95)	3 96*** (0 31)	18 79* (8 98)	2 03*** (0 34)	21 52 (9 32)	3 28*** (0 15)	16 48+ (9 25)	2 71*** (0 19)	28 87*** (7 74)	3 33*** (0 17)	14 95 (9 19)	2 98*** (0 43)	29 70*** (8 11)	2 89*** (0 14)	25 36** (7 72)
	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
2	0 28	0 35	0 09	0 25	0 20	0 30	0 17	0 26	0 18	0 31	0 09	0 28	0 16	0 33	0 00	0 22	0 09	0 31
F	14 13	8 18	4 87	5 28	11 98	6 43	9 65	5 34	10 46	6 81	4 91	5 82	9 42	7 40	0 00	4 36	4 77	6 88

+ < 0 1, * < 0 05, ** < 0 01, *** < 0 001 R u t r ̈ O Sr gr ion Un nd rdi d r gr ion r i nt r r rt d Sp nd rd rr r in r nt n Tn ̈ d w\u r r i nt r tn r\ tion\ni ̈ tw n tn r v riabl nd g nd r ̈ in u_tup_ tigntn R\igiou d in tni ̈ w r ̈ in d nd r ̈ ut d r ̈ tn ; wR r n nt r (2014) ̈ r ̈ tn r ̈ in r r\igion (g, J w n itn) w r n id r d ̈ ut n t igni nt To ̈ k tn w nd continu u , tn w\u tn tw r <1 • w r r d y r

[illegible]unity [illegible]di [illegible]ri[illegible]ina[illegible]tion, [illegible] w [illegible] d [illegible] r[illegible]tion [illegible] w R [illegible]r [illegible]n [illegible]nt r (2014) [illegible]nt[illegible] r [illegible]nt[illegible]g [illegible] [illegible] vi wing [illegible]n[illegible]ie-xu[illegible]ity [illegible] [illegible] A [illegible]nown in [illegible] 6, [illegible]n [illegible]r [illegible] xi[illegible] [illegible] w r [illegible] itiv [illegible]y r [illegible]t d t[illegible] g nd r[illegible] in u.tu[illegible] tignt-n ([illegible]r [illegible]t xi[illegible] [illegible] i, $b = 3.27$, $S = 0.93$, $= 0.001$, [illegible]r [illegible]t xi[illegible] [illegible] ii, $b = 4.74$, $S = 1.00$, < 0.001), [illegible] itiv [illegible]ttitud t[illegible] w[illegible]rd [illegible]ST individu[illegible] w r [illegible] n [illegible] tiv [illegible]y r [illegible]t d t[illegible] g nd r[illegible] in u.tu[illegible] tignt-n ([illegible]r [illegible]nt[illegible]g [illegible] [illegible] vering n[illegible]ndi[illegible]ri[illegible]i-n[illegible]tion [illegible]ST r[illegible]t tion, $b = -6.67$, $S = 3.16$, $= 0.040$, [illegible]r [illegible]nt-[illegible]g [illegible] [illegible] vi wing [illegible]n[illegible]ie-xu[illegible]ity [illegible] [illegible], $b = -5.82$, $S = 1.43$, < 0.001)

M[illegible] [illegible]v rr r [illegible]nt[illegible]tion in[illegible] giv n d[illegible]in [illegible]y[illegible] [illegible]r [illegible]nt[illegible] [illegible]r[illegible] [illegible] [illegible]n[illegible]nr[illegible]t [illegible]r w[illegible]n [illegible]n wn[illegible]r in [illegible]n [illegible]inority [illegible]nu ugg t [illegible]n[illegible]t [illegible]t wi[illegible]n[illegible] [illegible]nigh r [illegible]nt[illegible]g [illegible] [illegible][illegible]-d[illegible]in[illegible]t d indu tri [illegible]r [illegible]ter [illegible]ik[illegible]y t[illegible]n[illegible] v [illegible]rg r g nd r[illegible] in u.tu[illegible]

Table 6. ink tw n g nd r-r t d nr t nd g nd r in u tur tign tn

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16
t xi \i	3.84***	3.27**														
	(0 96)	(0 93)														
t xi \i ii			4.55***	4.74***												
			(0 76)	(1												

...gy in two...n, $b = -0.06$, $S = 0.05$, $= 0.223$, ...rrative d...ti...vi...n, $b = 0.23$, $S = 0.36$, $= 0.530$, ...nd ...rrative nu...n ...k...king, $b = -0.23$, $S = 0.18$, $= 0.198$). Our int...r...t...tion ...tni...nding i...t...t unik...gnd...r-r...t...d ...i...t...nr...t ...t...n ...xi...wni...n...r ...r...iv...in ...i...ti..., gnd...r-r...t...d ny...i...t...nr...t ...r ...r...tiv...y... ...r...i...n. A...u...n, t...n ...r...t...tion ni...tw...n ny...i...t...nr...t ...nd gnd...r...i...in u...tu...tigntn i...n...t ...rti...u...y ...tr...ng ...nd...r...i...in u...tu...tigntn in A...i...n ...i...ti... ...r...i...n. ...r...i...n ...i...t...d with gnd...r-r...t...d ...i...t...nr...t...n ny...i...t...nr...t

Links to gender equality in leadership and innovation

...n...xt ...x...r...d...n i...i...t...tion ...f gnd...r...i...in u...tu...tigntn ...t...n...ng...n 50 US ...t... S...i...y, w...inv...tig...t...d t...n...r...t...tion ni...tw...n gnd...r...i...in u...tu...tigntn ...nd gnd...r in qu...ity r...g...rding ...d...r ni ...nd innov...tion g...t...n ...t...v...d...nt...t...g...r gnd...r...i...in u...tu...tigntn i...i...t...tr...ng...r ...r...i...n...nd...i...t...n...t...n...i...n, w...ugg...t ...t...t gnd...r...i...in u...tu...tigntn wi... ...r...iti...y... ...r...i...t...d with gnd...r in qu...ity in...r...wn...r in...t...n...t...tu...qu...n...d t...r...l...n...ng d...nd...ru...nd ...r...i...n...d t...r...l...r...vid..., u...ng in...d...r ni ...nd innov...tion. A...w...ri...l...nd t...n ir...rr...nding d...t... ...ur...w...r...known in Table S1.

...u...d...n ...x...wing qu...tion t...g...u...t gnd...r in qu...ity in ...u...r...t...v...d...nd...nt...w...ri...l..., with...nign...r...r indi...t...ing...t...t...w...r...w...r...i...n...r...r...r...nt...nding ...rti...u...r...r...g..., (i...d...r ni...r innov...tion)

$$\text{Tn gnd...r in qu...ity in} = 1 - \frac{\text{Tn nu...l...r...w...r...i...n in}}{\text{Tn nu...l...r...i...n in}}$$

T...inv...tig...t...n r...t...tion ni...tw...n gnd...r...i...in u...tu...tigntn ...nd gnd...r in qu...ity in...d...r ni ...nd innov...tion, w...ondu...t...d tw...t...r...y...uing ni...r...r ni...in...r...l...d...ling (HM). F...r...nd...nd...nt...w...ri...l..., w...r...t...ndu...t...d r...gr...ion with...ut...ny...ntr...w...ri...l..., t...n, w...ntr...d...r...D...f...r...n...i...t..., gnd...ri...l...n...in...r...u...tion, ...nd t...n...n...t...t...v...i...u...tu...tigntn...r...r...l...Hi...rrington ...nd...nd (2014) (4). ...ntr...d...r...D...f...r...n...i...t...v...d...n...t...t...w...v...r...n...i...d...v...r...l...nt in...r...gnd...r in qu...ity (6.2). ...r...ntr...d...r gnd...ri...l...n...in...r...u...tion ...u...un qu...gnd...r di...ri...ution (i...l...r...l...n...t...n w...l...n) ...l...n...l...n...v...l...r...dv...nt...g...nd...l...n...v...r w...l...n, ...ding...t...gr...t...r gnd...r in qu...ity in...d...r ni ...nd innov...tion (8, 12). ...ught...t...i...t...t...n uniqu...t...r gnd...r...i...in u...tu...tigntn ...y ...ntr...ing...r...t...n...r...t...t...u...tu...tigntn ...nd...ing...r, w...i...i...t...d...l...n t...t...t...g gnd...r...i...in u...tu...tigntn ...x...n...t...ry...w...r...v...r...nd...yond ...g...n...l...r...ur...r...t...u...tu...tigntn ...n...l...d..., t...x...u...t...n in...lu...n...r...gr...t (i...ti...l...ri...) tr...nd, w...ntr...d...r...n y...r...x...d...t...y...ding...n...r...n y...r...du...l...y...r...i...d.

Gender inequality in business and political leadership

T...inv...tig...t...n r...t...tion ni...tw...n gnd...r...i...in u...tu...tigntn ...nd gnd...r in qu...ity in...d...r ni...t...n...t...v...,...w...r...u...n tw...di...tin...t...d...r ni d...l...in ...u...in...d...r ni ...nd...x...iti...d...r ni (68, 69). F...r...u...in...d...r ni, w...x...t...d d...t...f...r...l...n...n...titu...i...n...l...Sh...r...h...ld...r S...rvi... (SS) ...nd ...l...ut...t (2007–2020) t...r...l...ut...n gnd...r in qu...ity in...r...t...Bl...rd ...nd ni...x...ut...v...r...r (CO)...r...ubli...y t...d...d...l...ni. Furt...r...r...r, w...u...d...t...b...r...l...n US ...nu...Bur...u A...i...n...l...unity Surv...y (ACS, 2005–2019) t...r...l...ut gnd...r in qu...ity in di...r...nt ...l...ng...l...nt...v...r...u...tion, in...luding t...r...x...ut...v...

As shown in Table 7, our r...ut indi...t...d t...t gnd...r...i...in u...tu...tigntn w...r...iti...y... ...r...i...t...d with gnd...r in qu...ity in Bl...rd ...r...ubli...y t...d...d...l...ni ($b = 0.03$, $S = 0.01$, $= 0.010$), ...w...s...CO...r...u...l...ni ($b = 0.04$, $S = 0.02$, $= 0.046$). Furt...r...r...r, t...n...r...t...tion ni...tw...n gnd...r...i...

Table 7. ink tw n g nd r in u.tura tigntn nd g nd r in quality in u in d r ni

Variables	Gender inequality in boards of publicly traded companies[a]		Gender inequality in CEOs of publicly traded companies		Gender inequality in management occupations: total		Gender inequality in management occupations: top executives		Gender inequality in business leadership (aggregated)[b]	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
nd r in u.tura tigntn	0.03**	0.03*	0.03*	0.04*	0.04***	0.03**	0.03***	0.03***	0.30***	0.31***
	(0 01)	(0 01)	(0 01)	(0 02)	(0 01)	(0 01)	(0 00)	(0 01)	(0 07)	(0 07)
O t r in (.g)		0 18***		0 45***		−0 05		0 04		0 63**
		(0 04)		(0 08)		(0 03)		(0 03)		(0 28)
nd ri n in u tion		0 5		0 85+		1 16***		0 09		7 3 ***
(r nt n w n)		(0 8)		(0 48)		(0 5)		(0 16)		(1 59)
t u.tura tigntn		0 00		0 00*		0 00		0 00		0 01
		(0 00)		(0 00)		(0 00)		(0 00)		(0 01)
n t	0 55***	−1 47***	0 8 **	−4 9***	0 8***	0 75*	0 50***	0 08	−1 57***	−8 70***
	(0 03)	(0 44)	(0 04)	(0 87)	(0 03)	(0 36)	(0 0)	(0 31)	(0 1)	(6)
Y r	2007–2020	2007–2020	2007–2020	2007–2020	2005–2019	2005–2019	2005–2019	2005–2019	2007–2019	2007–2019
	676	676	664	664	750	750	750	750	6 9	6 9

+ < 0 1, * < 0 05, ** < 0 01, *** < 0 001 R u t r ni r ni in r d ing Un nd rdi d r gr i n r int r r rt d St nd rd rr r in r nt n Th d u r r int t n r tion ni tw n tn ri nd g nd r in u.tura tigntn nd r in quality in rd nd O ubli ytd d ni w in d nd ut d r n titutiona Sur d r rvi (S) nd ut t (2007–2020), wh i g nd r in quality in g nt tion, in uding t x utiv , w in d nd ut d r US n u Bur u A ri n unity urv y (2005–2019) nd r in quality in u in d r ni w u t d by king n v g t n nd rdi d g nd r in quality in rd ubli ytd d ni nd t a g nt tion

Table 8. ink tw n g nd r in u.tura tigntn nd g nd r in quality in itia d r ni

Variables	Gender inequality in US Senators		Gender inequality in US Representatives		Gender inequality in State Senators		Gender inequality in State Representatives		Gender inequality in State Governors		Gender inequality in political leadership (aggregated)[b]	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
nd r in u.tura tigntn	0.05*											

/F0F0 1 Tf 0 2106 1j 2 1d ( ) Tj 1 1 Tf (363 /TH< 1 Tf ( ) Tj ET EMC /TD<</MCID 26>>BDC BT 66 9474 -2 21 Tf ( ) Tj TL 08 816Tf ( ) Tj /F7/F0 1 Tf 0 2106 j 2 1d ( ) T4 -21 1

Table 9. ink tw n g nd r in u tura tigntn g nd r in quality in innov tion (t nt inv nter g nd ST M e u tion)

Variables	Gender inequality in patent inventors: utility[a]		Gender inequality in patent inventors: design		Gender inequality in patent inventors: plant		Gender inequality in patent inventors (aggregate of design, plant, and utility patents)		Gender inequality in STEM occupations	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Gnd r in u tura tigntn	0.01***	0.01***	−0.01	−0.01	−0.01	0.07	0.01***	0.01**	0.01**	0.01**
	(0 00)	(0 00)	(0 01)	(0 01)	(0 08)	(0 12)	(0 00)	(0 00)	(0 00)	(0 00)
Ot r ri ib (wg)		−0 07***		−0 25***		1 05+		−0 10***		−0 03
		(0 01)		(0 07)		(0 54)		(0 01)		(0 02)
Gnd ri fi tion in e u tion		0 28**		−0 43		5 68		0 25*		0 45***
(fr ti n tig n w fi n)		(0 08)		(0 38)		(3 62)		(0 10)		(0 13)
Sp t u tura tigntn		−0 00*		−0 00*		0 01		−0 00**		−0 00
		(0 00)		(0 00)		(0 01)		(0 00)		(0 00)
on t nt	0 85***	1 68***	0 85***	3 66***	0 36	−11 51+	0 85***	200***	0 63***	0 97***
	(0 01)	(0 15)	(0 04)	(0 76)	(0 28)	(6 10)	(0 01)	(0 17)	(0 02)	(0 22)
Y r	2008–2020	2008–2020	2008–2020	2008–2020	2008–2020	2008–2020	2008–2020	2008–2020	2005–2019	2005–2019
	650	650	650	650	187	187	650	650	750	750

+ < 0 1, * < 0 05, ** < 0 01, *** < 0 001 R ut r fi ni in r ri in r fi ting Un n rdi d r gr ion . int r r ort d n r ni . Th fi d w u r r in t r tion ni tw n gnd r in u tura tigntn g nd gnd r in quality in u tura tigntn , Gnd r in quality in t nt inv nter w fi d in d nd fi ut d r fi tion t nt i wr ort d by th US t nt nd Tr d fi k O (US fTO, 2008–2020), wni g nd r in quality in ST M w fi d in d nd fi ut d r fi tion th US en u Bur u A fi ri n fi fi tunity urv y (A , 2005–2019)

gnd fi tinvd Sub qu nty, u ingdi fi tigut d t nt inv nter fi gnd fi -gnd r ink d d t r fi tion Gen N fi R gnition y t fi, fi - r nt nnergy r du d by BM (BM- NR), gnd tn O w rkdwid gnd r- fi ti ry (ND), tn t nter w fi tid nti y tn gnd r r ugn- y 93 inv nter (70) Our y w r d n t nt wn r in tn gnd r tn inv nter w r viu y id nti du- ingtn fi v fi tinvd

T 9 nw d tg nd r in u tura tigntn w r i- tiv y r t d tg nd r in qu ity in u er t nt (= 0 01, = 0 004, = 0 004) i y, gnd r in u tura tigntn w r i tiv y r t d tg nd r in qu ity in utility t nt u- (= 0 01, = 0 003, < 0 001) ut n t igni nty r t d tg nd r in qu ity in d ign t nt u (= −0 01, = 0 01, = 0 714) r nt t nt u (= 0 07, = 0 12, = 0 550) On t ntia x an tion i tt t w ging tu qu y fi u n r in tr in v ing utility t nt fi- r d with d ign nd nt t nt utility t nt r gnt d r n w di v ri nd inv ntion t nnergy nd r du t, wni n r quir nigh v l r inv ntiv n (71) n ntr t, d ign t nt r r n w d ign x iting r du t nd nt t nt r r ti n nd r r du tion n w nt ri ty, inv ving fi r in r fi nt inn v tion (2, 72, 73)

Sin fi r utility t nt r d in ST M d (8), w x- fi lin d tn r tion ni tw n gnd r in u tura tigntn gnd gnd r in qu ity in ST M u tion , wni w fi- ut d y u ing tn qu tion fi ntion d v with n d r fi tn US gn u Bur u A (2005–2019) A own in T 9, tn y w r ind d itiv y r t d (= 0 01, = 0 005, = 0 003) Tn ti, t t t fi r n tn int n w fi n tn n fi n v w r w fi n in ST M u tion

Si fi y, t tn xt nt t t du tion t in fi nti n ry r inn v tion nd d t d gr inv v rigin k now dg r tion (y r utility inn v tion) (74–76), w x- fi lin d tn r tion ni tw n gnd r in u tura tigntn gnd gnd r in qu ity in nigh r du tion t in fi nt A own in T 10, gnd r in u tura tigntn w r i tiv y r t d tg nd r in qu ity in t ining d t d gr (= 0 01, = 0 002, < 0 001) ut n t igni nty r t d tg nd r in qu ity in t ining fi n r d gr (= −0 000 2, = 0 01, = 0 871), fi t r d gr (= 0 01, = 0 03, = 0 625), n r i d- gr (= 0 04, = 0 02, = 0 107) n u fi, ur r ut nw d t t t wi n tigt r u tura n t nt n w fi n (r fi r d with fi n) v w r nu fi r w fi n t nt nd r, w r w fi n in ST M u tion , gnd w r w fi n with d t d gr

Additional analyses on gender inequality in entrepreneurship

x r x fi lin d tn r tion ni tw n gnd r in u- tura tigntn gnd gnd r in qu ity in ntr r n ur ni i dd- itiona vid n n tn r du tn r tn r tion ni tw n gnd r in u tura tigntn gnd gnd r in qu ity in innov- tion, giv n t t ntr r n ur ni t n inv v di ru tiv in- nov tion t r k xi ting indu try ru (77, 78) Tt, ntr r n ur r individua wn r r fi r v cuti ni ur- r nt tt n r du tion y r ting n w du t, rvi , gnd r (79), gnd n y y r king ru tn rtn t- ing nv ntiona wid fi n ntr r n ur fi rging u in r rtuniti (80–83) A rding y, w t d d n tn own r ni r rtu r fi r fi tn Annua urv y ntr r n ur (A , 2014–2016) gnd fi ut d gnd r in qu ity fi ng tn own r r tn r fi A r fi v urv y with

e u en yeung r ‘l j nd tn x ri n e r‘l ewn r (i n-
tr r n ur), tn AS e . t d in er‘‘ tion j nnu . y en u te 4
ewn r re‘‘ j ‘‘ i . e j out 290,000 r‘‘l with j id ‘‘l . y
ev r tn ntir riv t n n gri u tur . US en e‘‘y (84) T . 56
‘new d to t g nd r ‘‘ in u tur . tigntn w e itiv . y r-
. t d te g nd r in qu . ity in ntr r n ur ‘ni (i nu‘‘ r e
j rtu r‘‘l ewn d ‘‘y we‘‘l n v r u ‘‘ n) (=0 03, =0 01,
<0 001) Te tn xt nt to t ntr r n ur ‘ni i j ‘‘ in j tn te
r‘‘l ewn r ‘ni (85) j e . . v wg- d ‘‘ . y‘‘l nt te
j rt tn ir ewn u in (86), w j . e x j ‘‘in d tn r tion ‘ni
‘‘ tw ng nd r ‘‘ in u tur . tigntn j nd g nd r in qu . ity in
r‘‘l ewn r ‘ni e j . ty e r‘‘l (Surv y e Bu in Own r
[SBO, 2002–2012] re‘‘l tn US en u Bur u) j nd ound to t
tn y w r j . e e itiv . y r t d (=0 02, =0 01, =0 009)
T k n tg tn r, ur nding ugg t to t w r we‘‘l n ‘‘ e‘‘l
ntr r n ur in t wn r we‘‘l n r ‘‘er en te in d y
u tur . ner‘‘l tn n‘‘l n, whi n i en i t nt with ur tn ery
to t t with tight r u tur . en te int en we‘‘l n (e‘‘l r d
with ‘‘l n) v ew r . v i e innov tion

Additional analyses on three gender equality scores

Te urtn r ‘‘l iri j . y di r nti t g nd r ‘‘ in u tur . tigntn j nd nr g nd r qu . ity e r , w r t endu t d j ri e j . y te t tn r tion ‘ni ‘‘ tw n tn nr g nd r qu . ity e r j nd e ie itij . ter j nd g nd r-r . t d nr t Tn r u t (u‘‘ ‘‘ry in T . 57) indi t d to t tn ev j . r tion ‘ni ‘‘ tw ng nd r ‘‘ in u tur . tigntn j nd e ie itij . ter j nd g nd r-r . t d nr t (nt g e u ert d re e ition =81 0) j . r d tigntly tr ng r to n tn r tion ‘ni ‘‘ tw n tn nr g nd r qu . ity e r j nd u n j ter (r t g nd r j rity ind x, nt g e u ert d re e ition =76 2 , r t g nd r qu . ity e r , nt g e u ert d re e ition =76 2 , j nd r t ‘‘uni i j . qu . ity ind x, nt g e u ert d re e ition =76 2) Furtn r‘‘er , w endu t d j ri e j . y te t t tn r tion ‘ni ‘‘ tw n tn nr g nd r qu . ity e r j nd g nd r in qu . ity in . d r ‘ni j nd innov tion, in whi n g nd r ‘‘ in u tur . tigntn j nd tn nr g nd r qu . ity e r w r in ud d . e 0 r 0 te in to HM te r dit g nd r in qu . ity in . d r ‘ni j nd innov tion Tn r u t (u‘‘ ‘‘ry in T . 58) indi t d to t tn tr ngtn e tn r tion ‘ni ‘‘ tw n tn nr g nd r qu . ity e r j nd g nd r in qu . ity in . d r ‘ni j nd innov tion w r r tty ew (r t g nd r j rity ind x, nt g e u ert d re e ition =2 1 , r t g nd r qu . ity e r , nt g e u ert d re e ition =4 21 , j nd r t ‘‘uni i j . qu . ity ind x, nt g e u ert d re e ition =0 0) j nd igni j nt y w k r to n tn tr ngtn e tn r tion ‘ni ‘‘ tw n g nd r ‘‘ in u tur . tigntn j nd g nd r in qu . ity in . d r ‘ni j nd innov tion (r nt g e u ert d re e ition =84 2)

Fer urtn r v ri j tion, w endu t d j ri e j . y te in v tig t tn in r‘‘l nt . v . idity e g nd r ‘‘ in u tur . tigntn with r g rd te it t tn g nd r in qu . ity in . d r ‘ni j nd innov tion j ‘‘ev j nd ‘‘ y nd tn t e tn nr g nd r qu . ity e r (u‘‘ ‘‘ry in T . 59) Tn r u t e ur j . y , in whi n g nd r ‘‘ in u tur . tigntn j nd tn nr g nd r qu . ity e r w r in ud d t e ter into HM te r dit g nd r in qu . ity in . d r ‘ni j nd innov tion, indi t d to t tn t e g nd r ‘‘ in u tur . tigntn en g nd r in qu . ity in . d r ‘ni j nd innov tion r ‘‘ in d igni j nt y t r en- tr . ing er tn nr g nd r qu . ity e r (with j x tion, it t en g nd r in qu . ity in ‘‘ g rd e u li . y to d d e‘‘-
j ni ‘‘ j ‘‘ r gin . y igni j nt b =0 03, =0 01, = 0 074) j nd ‘‘ te r tn nr g nd r qu . ity e r t ‘‘ j ‘‘l
nen igni j nt (r t g nd r j rity ind x, nt g e u ert d re e ition =15 8 , r t g nd r qu . ity e r , nt- g e u ert d re e ition =2 1 , j nd r t ‘‘uni i j . qu . ity ind x, nt g e u ert d re e ition =0 0)

n ddition, wn n g nd r ‘‘ in u tur . tigntn ‘‘d igni- j nt t en tn ut e‘‘l in ur ‘‘ in . y , w urtn r t t d wn tn rtn r w r igni j nt di r n ‘‘ tw n tn - t i e g nd r ‘‘ in u tur . tigntn j nd tn nr g nd r qu . ity e r , r tiv . y Tn r u t (u‘‘ ‘‘ry in T . 59) indi t d to t g nd r ‘‘ in u tur . tigntn ‘‘d igni j nt y tr ng r t i to n tn nr g nd r qu . ity e r in ‘‘ te r tn re e ition (i t i tr ng r to n to t e r t g nd r j rity ind x in 93 8 e re e ition , t i tr ng r to n to t e r t g nd r qu . ity e r in 81 3 e re e ition , j nd t i tr ng r to n to t e r t ‘‘uni- i j . qu . ity ind x in 93 8 e re e ition)

Ov j . j . tn ugn tn nr g nd r qu . ity e r j j r d r- . t d te g nd r ‘‘ in u tur . tigntn , tn y‘‘d igni j nt y

w k r o i tion with g nd r in qu ity inv d r'ni nd innov tion int r r t tion nding vid n t t g nd r in u tur tigntn nd tn tnr g nd r qu ity r id ing in di r nt ne"le gi n t [2] "l rm nty, w v nd vid n t t g nd r in u tur tigntn w ti t d t r g nd r in qu ity inv d r'ni nd innov tion. Bev nd y nd tn t r tn tnr g nd r qu ity r nd tn t i w r g n y tr ng r t n tne r tn tnr g nd r qu ity r

Discussion

Tni r r'n r v t t, in g n , we"l n r "er n tr in d y u tur n er"l t n "l n in tn Unit d St nd t tn r i ign nt v ri tion in g nd r in u tur tigntn r re tn 50 t Su n v ri ility r t d with r i ri citi l t r (r ligion nd citi l id ology) nd g nd r-r t d tnr t "l rm nty, w und t t g nd r in u tur tigntn i t d with g nd r in qu ity (l v ring "l n) in u in nd citi l d r'ni nd innov tion t tn t t i v.

Tni r r'n "l k v l n r ti l ntribution t tn it tur n u tur tigntn nd g nd r in qu ity Fir t, it ntribut t tn u tur tigntn tn ry y r ring n w in ight int rv wtn r giv n r i ty u tur n er"l l y qu ty t r "l ng nd we"l n ri r r r'n tn d u nt d t t tn r i wid v ri ility in tigntn r re tion , t , nd r vin (1, 2, 4) H w v r, tni r r'n did n t inv tig t wtn r tn xt nt r u tur tigntn i tn l "l r l tn "l ng nd we"l n ing giv n tion r r gion r gu t t g nd r in u tur tigntn xi t r r i ti t t tni tn i with d r "l tn US 50 t nd und t t v n witnin tn l "l t , tn r "l y di r nt d gr r n r "l tiv n t int nd t n r nt v vior r we"l n v ru "l n (i g nd r in u tur tigntn) Our nding ign ignt t t u tur tigntn "l y n t v id qu ty t v ry individu l witnin giv n r i ty n rti u r, r "l r i ti r t t "l r n t int n we"l n tn n "l n

S nd, tni r r'n nd urtn r ightu n n w u ng nd r in u tur tigntn i r nti ly r"l ding giv n t Our nding r v l d t t g nd r in u tur tigntn r t t v r i d with v ri ty r i ri citi l t r nd g nd r-r t d tnr t Fr x "l , r in t t t ign y w u r ligion nd v "er r id nt n cding r in r ligiou i (g Mor"l ni "l) r "er ikely t nder t ditiona g nd r r , tn ttitud r r i d with gr t r g nd r in u tur tigntn nt r ting y, n t r ligion r r i d with gr t r n t int n we"l n (g n g tiv r ition, g tn ci nd J w , n n ign nt r ition, r t nt nd tn r ri tion), ugg ting tn i r ligiou d tri "l t r Additiona y, citica id ology (g citica n r ti "l) nd g nd r-r t d r l tnr t (g xi "l nd "l n v r r r nt tion) w r r itivity r i d with g nd r in u tur tigntn

Third, ur r r'n d "l n t t t g nd r in u tur tigntn w i "l rm nt i "l i tion n g nd r in qu ity in

[2] Ne"le gi n twork r r t r y t "l inti w t r t n tru t r n tn r nd t r "l ry tion (87) Di r nt ne"le gi n t "l n t tn r "l r d n tru t v di r nt r tion ni with tn r v ri l (g out r"l) (88) For x "l , in our tudy, g nd r in u tur tigntn w r i d with g nd r in qu ity in US 50 t r , tut tn tnr g nd r qu ity r w r n t i d with ni out r"l , ugg ting t t g nd r in u tur tigntn nd tn tnr g nd r qu ity r id ind di r nt ne"le gi n t

d r'ni nd innov tion r t inv v "l nt nd v ni v "l nt in d r'ni nd innov tion l ng "l n t n we"l n v l n nti ty und in "l ny n e"l i (8, 12) R r'n r v in ri ing y u d n und r nding tn g nd r in qu ity in tn d e"l in On tr "l r r'n x "l in di r n in individu l t ri ti tw n "l n nd we"l n (g r n ity, int ign , nd ri k r r n) nd w tn y r i d with g nd r in qu ity inv d r'ni nd innov tion (8, 89, 90) An tn r tr "l r work inv tig t n e"l i t r (g di r n in tn y r "l n nd we"l n), in titution l nd citica t r (g di r n in r i urity nd i ility r n r ur r "l n nd we"l n), nd r i t r (g r judi , r n tion , nd tr ty t t we"l n) (8, 89, 91) Tn r r r u tur n er"l in v ing g nd r in qu ity inv d r'ni nd innov tion, n v r, v n rg y g t d By x "l ining tn r tion ni tw n g nd r in u tur tigntn nd g nd r in qu ity inv d r'ni nd innov tion, urr r r n dditiona unt t n t r und r tnd g nd r in qu ity in r ity r"l u tur r tiv For x "l , r r'n r v n t d in qu ity in innov tion ni v "l nt tw n "l n nd we"l n (2, 92) T tn xt nt t t u tur i t d with r tivity nd innov tion (2), tn r nt work ign ignt n w gr t r d gr r n t int i"l r d n we"l n v ru "l n ud r tic y x in tn innov tion v ng tn y

A witn r r'n, tn urr nt inv tig tion v "l i"l ity tion Fir t, tn d t w r t d n in vi MTurk T un k tni n rm, w nduct d ri r y n "l r nt tiv r t nduct d HM t x "l in i tn g nd r di tribution (0, we"l n, 1, "l n), v g g (in y r), nd v r g du tion (0, w r tn n tn l n r d gr , 1, qu t r ign r tn n tn l n r d gr) r tn g n u tion witnin tn t (r "l tn US n u Bur u [2020]) r i t d with ur "l g nd r, g , nd du tion v R ut n w d t g nd r di tribution nd v g du tion v r tn g n u tion witnin tn t w r itivity nd igni nty r t d with ur "l g nd r nd du tion v (r g nd r = 8 74, = 271, = 0 001, r du tion v = 0 00005, = 0 00005, = 0 09), n v r, tn v g g r tn g n u tion witnin tn t w itivity ut not igni nty r t d with ur "l g (= 0 14, = 0 09, = 0 10) Tn r ut ugg t d t t ur "l d "l gn i w r g n y itivity r t d with u tion nd "l gn i witnin tn t Furtn r "er, w u d t-t t t r "l r ur "l g nd r, g , nd du tion v witnin tn r tn g n u tion witnin tn t, r tivity (T bl S10 r tn d ri tiv u"l "l ry) n "l t r tn t (i 45 t in 50 t), ur "l g w w r tn tn v g g r tn g n u tion witnin tn t, nd ur "l du tion v w ign r tn tn v g du tion v r tn g n u tion witnin tn t r 50 t n e"l t (i 32 t , u ng g r, M in, nd Mi ign), ur "l n ti (i tn nu"l r e"l n/[tn nu"l r e"l n+tn nu"l r e we"l n]) w igni nty w r tn tn "l n ti r tn g n u tion witnin tn t, wn r in tn t (i 18 t , u ng g ni , in i , nd T x), ur "l n ti w r not igni nty di r nt r"l tn "l n ti r tn g n u tion witnin tn t Ov , ur "l w r y ung r nd "er du t d e"l r d with tn g n u tion witnin tn t, nd ur "l r"l t t w r "er r r nt tiv tn n tn r Hw v r, dditiona y n y n "l tn tri ti r v l d t t ny d vi tion tw n ur "l nd tn g n u tion in tr"l r

g nd r, g , nd du tion v w r not t ri y o t d with g nd r in u tur tignt n (r n di r n ing nd r b = −3 15, = 3 74, = 0 404, r n di r n ing g b = 0 06, = 0 06, = 0 357, r n di r n in du tion v b = 1 83, = 1 81, = 0 316, u l nt ry T xt nd Tb l 11) N v rtn , utur r r n ud u nd r ing l tn- rd with r r nt tiv l r t n rt tn g n - i ility o ur nding

S ond, ough w ur d g nd r in u tur tignt- n v r two w v urv y 1 r nd 2 ntn r rt nd und t g nd r in u tur tignt n tn t v r tiv ly l v rti l (i urr ut now d g d t– r t t ri ility g nd r in u tur tignt n tn t v nd t tn d r tion two w v nd l g l o- ition with i ic xitic t r nd g nd r- r t d tnr t , w g nd r in qu ity in d r ni nd innov tion), it i ti un r rwh n tn di r n r t would ng i ic r r nd nor l ng v r ng rti l ri d Tnu , utur r r n ud ur t t k w g nd r in u tur tignt v v r ng rti l ri d u ng v r tn n xt 5 t 10 y r

Tnird, with r - tion r r n, w r un l t un quiv ly r n in u ity l ng tn k y ri l l know dg t titi u il t t ng nd r in u tur tignt nd g nd r in qu ity ut l r driv n y tn l r (g ri igiou i r xitic id g i) T t tni i ility, w ndu t d ddition l y nd und t wh n tn two inty t ntion nt d nt ri l (i ic xitic t r nd g nd r- r t d tnr t) w r in- ud d in tn l d g nd r in u tur tignt , g nd r in u tur tignt ti x rt d titi y igni- nt t n r t ut l int r t (i g nd r in qu ity in u in nd xitic d r ni nd innov tion) Tn nding ign ignt tn uniqu ntribution g nd r in u tur tignt y nd n r t d t r nd rti y u g n- rn t t l tnird t r r i ution u y driving tn r- in ing nd r in u tur tignt nd g nd r in qu ity in d r ni nd innov tion N v rtn , utur r r n y x- r nov l tnod t bili in qu ity nd r i t ur nding

Fin y, tni r r n u d n tn g nd r in u tur tignt tn t v Futur work ud x in ntion l v g nd r in u tur tignt , di r n ing nd r in u tur tignt ik y xi t r ntion giv n di r nt ri igiou nd xitic nvironm nt Furtn r r , ough w und t t w l n r v l r n t in d y u tur nor l t n l ng r qu ity d in tn ir work nd i , r ri u in nnov d tn ry ugg t t t n (l r d with w l n) r r tri t d y l i nor l r g rd- ing g n y nd d lin n (20, 21, 93) Our tn ri ing nd r r- ri u in nnov d tn ry x i t u tn y v r di r nt r nor l —g nd r in u tur tignt v r t r nor l , wn r r r ri u in nnov d v r ny i t r nor l r t d t r tn r t tion r in nnov d t tu N v rtn , utur r r n ud inv tig t ndition und r wni n l ng r r n tn in d, nd tnu tignt r u tur nor l , t n w l n

Tn i lib tion n twitn nding, tn urr nt work r r- nt t r rwording dyn ing tn tn ry r u tur tignt By r gni ing t t u tur n tn int r r i di r nty n l ng nd w l n witnin tn l i ity nd t t u n di r n- r r r t d with ut l u ng nd r in qu ity in d r ni nd innov tion, w t tn g r utur inquiri t r inv tig t tn i i tion r u tur tignt n r n di n nd i v r y

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References

1 nd MJ, et l. 2011 Di r n tw n tignt nd ur- tur 33-n tion tudy Sc e ce 33 1100–1104
2 u RYJ, H ng K, Jin M 2019 M ing u tur tignt nd it ink to innov tion, ur ni tion, nd to in r r 31 rovin in in n t l Sc S 116 67 0–67 5
3 nd MJ 2019 Univ r l nd ut ur- i i tt rn o tignt n r n r r tn 31 in rovin n t l Sc S 116 65 2 -65 4
4 H rrington JR, nd MJ 2014 Tignt n r n r tn 50 Unit d t t n t l Sc S 111 7990–7995
5 k on J nd M, D S, ox A 2019 Tn r ning o A ri n ut ur v r 200 y r i o t d with r tivity- rd r t d - t m e v 3 244–249
6 B d D, et l. 2011 in in T M g nd rg t innov tion d 2022 A ri 1] tt //www i r gov/ it / d ut/i /ligt d/r rt / w in t g t innov tion8311 d
7 y t 2017 y id w in in S&#500 i ni d 2022A ri 3] tt //www y t y t rg/r r n/w in-in-tn - unit d- t -work r /
8 in JR, Ki T H, M D r tt T 2020 Und r nding r- i t nt nd rg in T M Sc e ce 368 1317–1319

9 id r , et l. 2019 n r ing g nd r div r ity in n T M r r'n w rk r Sc e ce 366 69 2-695

10 yn KS, ett r AR 2018 n ng nd d r'ni in n Unit d t r w ring n g nd rg ? ev r 5 27 -65

11 Mi iJ, et l. 2016 quity in innov tion w n inv nt r g nd t- nt d 2022 A ri] ntt //iw r rg/w - ent nt/ u d / 20/1 / 448- quity-in- nnov tion d

12 rd n ni Foru 2021 G A Gl b l Gend r R rt - d 2022 F br ry 15] ntt //www w ru rg/r rt / g b -g nd r-g -r rt- 2021

13 A , D vid A 1988 nnov tion in rg n d r ir n - iri g r y i m a ev 78 678–690

14 B BM, Riggi R 2006 r , rm ti l le er. nd d N w York y h l gy r

15 r N 2018 nd r tr ty ev l. 69 75– 98

16 dg JJ, itt M 2019 n n x t ion b n r ity work- l y i g ng nt nd id nity ch t ion c e ev 44 1 6–149

17 K u n 2000 D g nd r c ttitud tt r? F ily r- tion nd di cu ion long to diff r nc nd g d in n n nd w n J F mil . e. 21 1 8–144

18 g n Bordini GS r TM 2013 S xu l d u l nd rd r - vi w r n it tur tw n 2001 nd 2010 Se lt 17 686–704

19 ik n Y, M rk MJ 2014 A ent xi nd n xu l d u l nd rd Se le. 71 333–344

20 B r n JK, ik r n M, K g kow -B r N, Jur k , Q n M 2022 H rd r w n nd in r t? T ting n d u l nd ing nd r ru in 62 untri Se le. 87 1–19 ntt //d i rg/ 10 1007/ 11199-022-01 97-y

21 nd r JA, B r n JK, n n D, Burn rd RM, v r JR 2008 r ri u n d J er. Sc . l 95 13 5–1339

22 Hi n M 2012 nd r tr ty nd work n e. r e v. 3 2113–135

23 g n M, M tv GS ru A 2022 n n H rry ir d y n d u l nd rd in uni ning i ndu t J l t a 130 1184–1 48

24 B rry H nid , B n MK 1959 R tion nid t ining t r u i t n n ty m t r l 61 51–63

25 N yak MB, Byrn A, M rtin MK, A b A G 2003 Attitud t w rd vi n g in tw ing r -g tion tudy Se le. 49 333–34

26 G H n MR 2016 R ligiou i , nd r n- iu n , nd w n citi rti ip tion Se le. 75 514–5

27 n K D, H M , And r n T, ing n M 2017 n r nd r nd r ligion t di r nti ting nd r r id ogy nd r ligiou i ut nd r J l R r t 36 3–15

28 H w nd d it r 1999 el , me t l. m te m r t , um N w York g v M n

29 K inu A, E w r DR 2008 An x ing tion r nd r di r n in ttitud t w rd diver J u rce em rr e 49 39– 57

30 tt J 1998 ng ing ttitud t xu l ity r - g tion nt ri n Sc l 32815–845

31 nit n d A 2012 nd rid ogy nd r ligion d u- in i g r d tt r? ev el e. 54 139–156

32 B ng , H M, And r n T, ing M 2005 nni ity, - ut tion, nd r ligi ity r di t r ch g tu- d nt r x t ion Se le. 53 31– 37

33 B rtkow kiJ 2001 em te l m rr e: e er e t ti ev el l m le. N w Brun wik Rutg r Univ r ity r

34 ik , et l. 2000 B yond r judi i nti ny n ti nd n v nt xi r ut ur J er. Sc . l 79 763–775

35 ru yk , Hod n 2020 Tn r c r citi n r ti nd ing ry nd r i in r di ting r judi t w rd y n nd r n w r t n nd r Se le. 8 438–446

36 ik , Ek ST 1996 Tn n nt xi inv nt ry di r- nti ting n ti nd n v nt xi J er. Sc . l 70 491–51

37 H nd MD, Mi j v , H ng Y, Si y GG 2018 B n v nt xi nd n ti xi r tn g Sc . l er. l Sc 9 863–874

38 r J, Ov N H nd MD, E t n r 2017 n n d n in n ti xi r di tr tion ni ggr i n? Tn d ting r c r rtn r it nt Sc . l er. l Sc 8 331–340

39 H nd MD, Ov N 2013 M n n ti xi nd d r tion r inti t rtn r r ring di ti tion nd n g tiv v ri in r tion ni er. Sc . l 39 1585–1599

40 Ov N Si y GG n R 2011 Tn r t nd n it r x- i r i n t in un during r tion ni n it J er. Sc . l 101 71– 90

41 tt i r n 2002 i n g in tw n g r nd gnitud cet 359 1 2 -1 7

42 rld H lth Org ni tion (HO) 2021 i n g in tw n- n r w n ti t , 2018 g r , r gi n nd n tion r w n ti t rinti t rtn rvi n g in tw n- n nd g r nd r gi n r w n ti t rnon- rtn r x vi n g in tw n n d 2022 O t r 20] ntt //www wh int/ u i tion /i/it /9789 400 6681

43 Unit d N tion O i n Drug nd i (UNOD r R rt n Tr ki ng in r n d 2022 O t r 20] ntt //www und rg/d u nt /d nd ny i /ti / 2021/ OTi _ 2020_ _ v rvi w d

44 Stegdi RM 1950 d r'ni , r'ni nd rg ni tion . l ll. 47 1–14

45 rt A, Kri t -Brown A, B d y B H, B rri k MR 2008 O t n r tion d r'ni n r g i n n ngru- n int r ng nt t l c e J 51 81–96

46 Jung D, w c uA 2003 Tn r t n r tion d- r'ni in n ning rg ni tion innov tion y t m nd r i ing ry inding e er. 14 5 5–544

47 Ford M 1996 A n ry r individu l tion in ti u r d- in c e ev 21 111 -114

48 n B, Birkin w J 2004 Tn nt d nt , n qu n , nd i d ting r r g ni tion l id xt rity c e J 47 209–226

49 M r'n J GS nu M, n u X 2000 e mc , r le: c e wr tte r z ti l a e. Sh n rd Sh n rd Univ r ity r

50 in A, H ng K 2022 ning r tin t new rier x ri- n i t n u r innov tion tr nti tr tion J e 48 571–604

51 Bunr tr M, K ng T, ring SD 2011 A n i n ni Turk n w ur r in x n iv , y t ign-qu ity, ch ? er. ect . l Sc 6 3–5

52 B i X, B r MR, Ek ST 2020 A div rity in r , r d dexi y r iv r i gru r i r nc tl c Sc S 117 1 741–1 749

53 ring SD, M n 2015 nt rn tr r'n in y h l gy ev . l 66 877–902

54 r S , K itn M, Tn rnton MA 2015 A n M n ni Turk r indu tri nd rg ni tion y h l gy d v nt g ,

[illegible] ng [illegible]nd [illegible]ti[illegible]r [illegible]"[illegible]"i nd[illegible]tion *I* [illegible]r$_{0}$. c i *l* 8 171–179

55 [illegible]e[illegible] i [illegible] [illegible]nd r J 2014 n id [illegible]n Turk und r [illegible]nding M [illegible]ni[illegible] Turk[illegible] [illegible] rti i[illegible]nt [illegible]e[illegible] [illegible]rr r . c i *l* Sc 28 184–188

56 Dup[illegible]nt F, *et*$_{0}$ *l*. 2017 A"[illegible]Biv[illegible]nt t r[illegible]ty [illegible]ink te[illegible] [illegible], en-[illegible]i t,[illegible]nd in qu[illegible]ity[illegible] r[illegible] 38 n[illegible]tion *n c* $_{0}$*tl* $_{0}$ Sc S 114 669–674

57 [illegible]u J[illegible]Jin [illegible]A, [illegible]ng.i[illegible]n AS 2021 [illegible]e[illegible]tivi"[illegible]i r di t "[illegible]b[illegible]k u during [illegible]D-19 *n c* $_{0}$*tl* $_{0}$ Sc S 118(28) 2021793118 10 1073/[illegible]n[illegible] 2021793118

58 Ru[illegible]nn r , M[illegible]u"[illegible]i DJ 2016 Tin[illegible]t [illegible] d"[illegible]i ti[illegible]n[illegible]ir [illegible]ew u work, g nd r[illegible]nd [illegible]t[illegible] v[illegible] in titutiern[illegible][illegible]egi S c Sc *e*. 60 15–28

59 [illegible]unningh[illegible]"[illegible]i M 2005 [illegible]nd r in [illegible]v[illegible]Bib tien[illegible]nd "[illegible]rri[illegible]g [illegible]n in[illegible]u n [illegible] g nd r id [illegible]egy en[illegible]ew u work[illegible][illegible]e[illegible]tion [illegible]v r[illegible]n [illegible]i [illegible]ur *J* F$_{0}$ *m L*. *e*. 26 1037–1061

60 Ri"[illegible]n BJ, D[illegible]vi [illegible]2013 Fre"[illegible]i xre[illegible] te g nd r tru tur [illegible]rr S c *l* 61 733–755

61 [illegible]nd[illegible]e J, [illegible]en n D 1999 [illegible]tt rn [illegible] individu[illegible]i "[illegible]nd [illegible]e[illegible] t-ivi"[illegible]i r[illegible] [illegible]n Unit d St[illegible]t *J er*. S c . c i *l* 77 279–292

62 [illegible]y[illegible] [illegible]ndr[illegible]n[illegible] 2015 Tin r[illegible]t [illegible] g nd r in qu[illegible]ity ind v[illegible]e-ing [illegible]untri *ev a* 7 63–88

63 Kit M , [illegible]nit[illegible] y B 1996 [illegible] x di r n [illegible]in[illegible]ttitud te[illegible]rd [illegible]ne"[illegible]e xu[illegible] r en , [illegible]'[illegible]v[illegible]vier , [illegible]nd ivi right [illegible]"[illegible]i b-[illegible]n[illegible]y i *er*. S c . c i *l* 111 22336–353

64 [illegible]M[illegible]r , Kit M 1998 [illegible] x di r n [illegible]in[illegible]ttitud te[illegible]rd g y "[illegible]n[illegible]nd[illegible] [illegible]n [illegible]"[illegible]u tidi"[illegible]n ierp[illegible] r tiv *J* Se *e*. 35 189–196

65 [illegible]"[illegible]u[illegible]ne M 2019 Fer[illegible]nd in rt[illegible] y t "[illegible]ti r vi w e w e"[illegible]n [illegible]d r'ni in"[illegible]-de"[illegible]ing t d rg ni[illegible]tion[illegible] u tur in[illegible]n Unit d St[illegible]t *m e*. *r ev ev* 18 437–469

66 [illegible]p[illegible]y t e"[illegible]n in "[illegible]-de"[illegible]ing t d indu tri [illegible]nd e u[illegible]-tion , 2020 [illegible] d 2021 F[illegible]ru[illegible]ry 28] [illegible]ntt //www [illegible][illegible]y t rg/r [illegible]r'n/we"[illegible]n-in-"[illegible]-de"[illegible]ing t d-indu tri [illegible]nd-e u[illegible] tion /[illegible] y- eetnet -[illegible]ette"[illegible]-1-3710

67 Ke , Ketri[illegible] , Re[illegible]uk A 2015 [illegible]d r[illegible] "[illegible]. ?Tin re[illegible] e in-du try g nd r e"[illegible]e itien Se [illegible]le. 72 294–307

68 Frrin[illegible] F, [illegible]eurke J 2014 De[illegible] g nd r"[illegible]tt r er [illegible]e itie[illegible][illegible]d-r'ni ?Tin[illegible] e US"[illegible]yer *J bl c a* 112 24–39

69 Yuk[illegible] 1989 M[illegible]n[illegible] ri[illegible][illegible]d r'ni [illegible] r vi w e [illegible]n ery[illegible]nd r-[illegible] r'n *J c c e* 15 251–289

70 US [illegible]t nt[illegible]nd Tr[illegible]d "[illegible]rk O i , O i e [illegible]n [illegible]i en e"[illegible]i t, [illegible]regr [illegible]nd [illegible]et ntie[illegible] A re[illegible] e w e"[illegible]n inv nter en US [illegible]t-nt , 2020 [illegible]ntt //www u te gev/ it /d [illegible]u t/ i /de u"[illegible]nt / O [illegible]-D H [illegible]regr - [illegible]et ntie[illegible]-2020 d

71 H[illegible]ng K [illegible]Murp y F 2009 De[illegible] t nt te t gy [illegible]e [illegible]n [illegible]eng-run u [illegible]y e u[illegible]i kne w dg ? vid n re"[illegible]nu"[illegible]ng n ti [illegible]$_{0}$ $_{0}$ e *J* 5 21193–1221