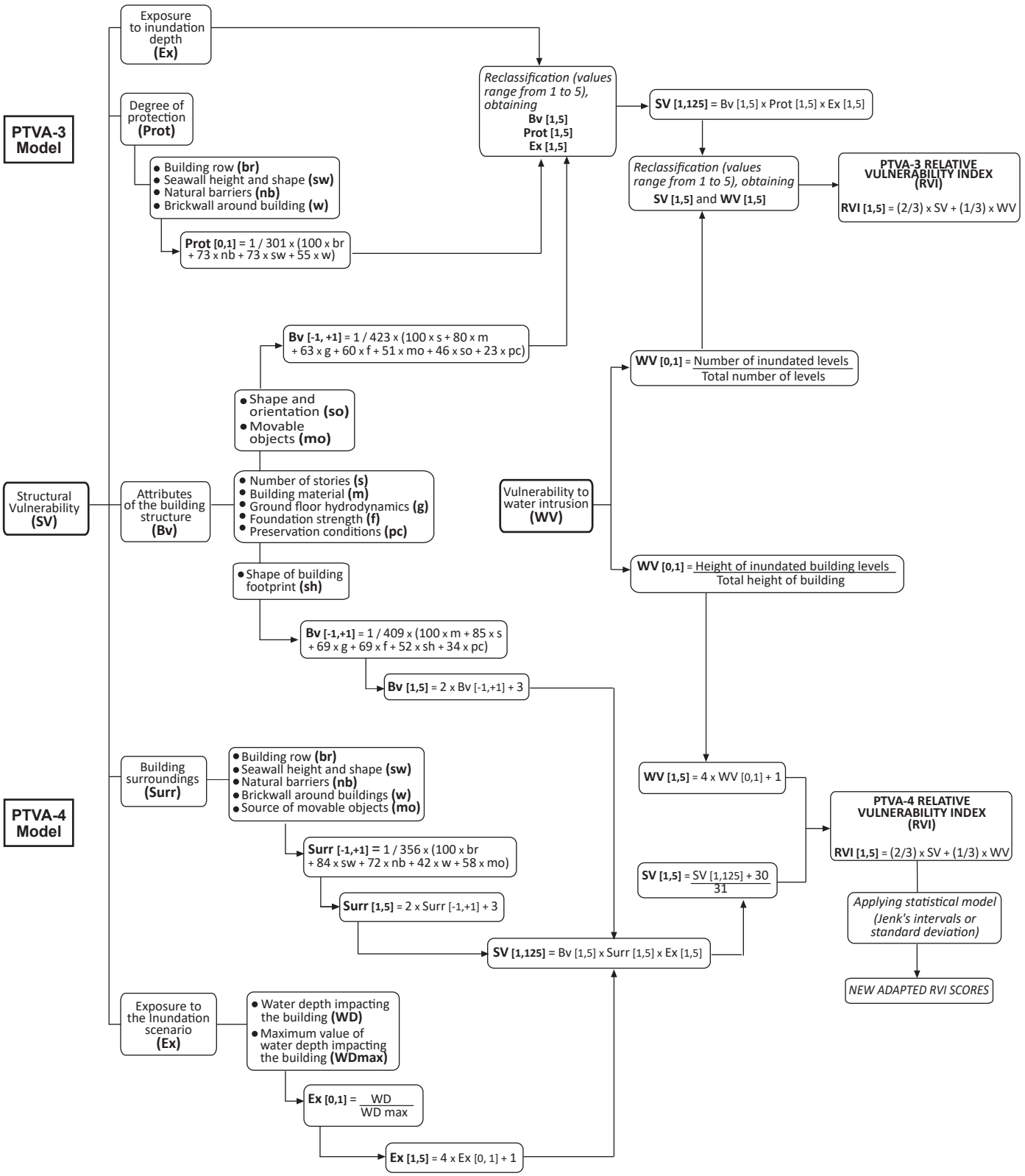
PTVA-3 Model
Structural Vulnerability (SV)
Exposure to inundation depth (Ex)
Degree of protection (Prot)
Building row (br)
Seawall height and shape (sw)
Natural barriers (nb)
Brickwall around building (w)
Prot [0,1] = 1 / 301 x (100 x br + 73 x nb + 73 x sw + 55 x w)
Reclassification (values range from 1 to 5), obtaining
Bv [1,5]
Prot [1,5]
Ex [1,5]
SV [1,125] = Bv [1,5] x Prot [1,5] x Ex [1,5]
Reclassification (values range from 1 to 5), obtaining
SV [1,5] and WV [1,5]
PTVA-3 RELATIVE VULNERABILITY INDEX (RVI)
RVI [1,5] = (2/3) x SV + (1/3) x WV
Attributes of the building structure (Bv)
Shape and orientation (so)
Movable objects (mo)
Bv [-1, +1] = 1 / 423 x (100 x s + 80 x m + 63 x g + 60 x f + 51 x mo + 46 x so + 23 x pc)
Number of stories (s)
Building material (m)
Ground floor hydrodynamics (g)
Foundation strength (f)
Preservation conditions (pc)
Shape of building footprint (sh)
Bv [-1,+1] = 1 / 409 x (100 x m + 85 x s + 69 x g + 69 x f + 52 x sh + 34 x pc)
Bv [1,5] = 2 x Bv [-1,+1] + 3
Vulnerability to water intrusion (WV)
WV [0,1] = Number of inundated levels / Total number of levels
WV [0,1] = Height of inundated building levels / Total height of building
WV [1,5] = 4 x WV [0,1] + 1
SV [1,5] = SV [1,125] + 30 / 31
PTVA-4 Model
Building surroundings (Surr)
Building row (br)
Seawall height and shape (sw)
Natural barriers (nb)
Brickwall around buildings (w)
Source of movable objects (mo)
Surr [-1,+1] = 1 / 356 x (100 x br + 84 x sw + 72 x nb + 42 x w + 58 x mo)
Surr [1,5] = 2 x Surr [-1,+1] + 3
SV [1,125] = Bv [1,5] x Surr [1,5] x Ex [1,5]
PTVA-4 RELATIVE VULNERABILITY INDEX (RVI)
RVI [1,5] = (2/3) x SV + (1/3) x WV
Applying statistical model (Jenk's intervals or standard deviation)
NEW ADAPTED RVI SCORES
Exposure to the Inundation scenario (Ex)
Water depth impacting the building (WD)
Maximum value of water depth impacting the building (WDmax)
Ex [0,1] = WD / WD max
Ex [1,5] = 4 x Ex [0, 1] + 1