Spearman Korrelationkoeffizient

$$r_{xy}^{S} = \frac{\sum_{1}^{n}(r_{xi}-\bar{r_x})*(r_{yi}-\bar{r_y})}{\sqrt{\sum_{1}^{n}(r_{x_i}-\bar{r_x})^2}*\sqrt{\sum_{1}^{n}(r_{yi}-\bar{r_y})^2}}$$

CO2	Year
792.793	2014
795.940	2015
801.655	2016
797.966	2017
759.002	2018

CO2	Rang		Year	Rang
792.793	2		2014	1
795.940	3		2015	2
801.655	5		2016	3
797.966	4		2017	4
759.002	1		2018	5

$$\downarrow \qquad\qquad\qquad \downarrow$$
$$\overline{r_{CO2}} = 3 \qquad\qquad \overline{r_y} = 3$$

$$\sum_{i=1}^{n}(r_{CO2}-\overline{r_{CO2}})*(r_y-\bar{r_y})$$

$$= \quad (2-3).(1-3) + (3-3).(2-3) + (5-3)(3-3) + (4-3)(4-3) + (1-3)(5-3)$$

$$= \quad 2 + 0 + 0 + 1 + (-4)$$

$$= \quad -1$$

$$\sqrt{\sum_{i=1}^{n}(r_{CO2}-\overline{r_{CO2}})^2} \qquad\qquad \sqrt{\sum_{i=1}^{n}(r_y-\overline{r_y})}$$

$$= \sqrt{(-1)^2 + 0 + 2^2 + 1^2 + (-2)^2} \qquad = \sqrt{(-2)^2+(-1)^2+0^2+1^2+2^2}$$

$$= \sqrt{1+0+4+1+4} = \sqrt{10} \qquad = \sqrt{10}$$

$$r_{xy}^{S} = \frac{-1}{\sqrt{10}.\sqrt{10}} = \frac{-1}{10} = -0.$$

$$\Rightarrow \text{Spearman korellation} = -0.1$$