The influence of vibronic interactions on the magnetic properties of the tetrameric square-planar mixed-valence d^0-d^0-d^1-d^1 cluster with two-electron transfer is investigated. The dynamic vibronic problem has been solved taking into account the Heisenberg and double exchange. It was shown that the double exchange and vibronic coupling leads to two types of pseudo-Jahn-Teller problems: $(^1A^n_1+^1A^d_1+^1B_1+^1B_2+^1E) \otimes (b_2+e)$ and $(^3B_2+^3A_2+^3E^n+^3E^d) \otimes (b_2+e)$. The dependence of magnetic properties on vibronic interaction was studied. All peculiarities of magnetic moments take place in the case of intermediate vibronic coupling. The results show that the vibronic interaction essentially affects the magnetic properties of the system, such as for the tetrameric tetrahedral cluster with one extra electron.