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Recently, a formalism for discrete time open quantum walks was introduced [S. Attal et al., J. Stat. Phys., 147 (2012) 832; S. Attal, F. Petruccione, I. Sinayskiy, Phys. Lett. A, 376 (2012) 1545]. This formalism is exclusively based on the non-unitary dynamics induced by the environment. This approach rests upon the implementation of appropriate completely positive maps. Open quantum walks include the classical random walk and through a realization procedure a connection to the Hadamard quantum walk is established. Open quantum walks allow for an unravelling in terms of quantum trajectories. It was shown [I. Sinayskiy and F. Petruccione, QIP 11 (2012) 1301] that open quantum walks can perform universal quantum computation and can be used for quantum state engineering. Microscopic derivation of open quantum walks in a system-environment approach will be presented and discussed in various limits. (Received September 17, 2014)