Let $\pi$ and $\pi'$ be two automorphic cuspidal representations defined on $GL_n(A_E)$ and $GL_m(A_F)$, respectively, with $E$ and $F$ cyclic algebraic number fields of prime degree. We use a prime number theorem for a generalized Rankin-Selberg L-function $L(s, \pi \times_{E,F} \pi')$ to put necessary conditions on the factorization of an L-function into a product of primitive L-functions, with each factor defined on $GL_k(\mathbb{A}_L)$, for $L$ cyclic of prime degree. (Received January 20, 2011)